Siemens Power Academy TD – North America 2012 Education and Training Catalog

Siemens Energy, Inc. Siemens PTI – Powerful training for leading industry, T&D, systems and planning engineers


www.usa.siemens.com/energy/pti-education
Today’s challenge

Emerging social, environmental and demographical trends present serious challenges for the energy industry worldwide. Our ability to meet future reliability requirements, maintain electrical grids and incorporate new technologies will be directly linked to how well this industry responds to these trends. We must determine sustainable pathways to address the demand for energy, expand reliable transmission systems and renew our infrastructure to create responsive distribution systems. As we address these challenges, one key element that will determine our success is to ensure this industry has the ability to attract, develop and retain a robust workforce that is skilled, motivated and prepared to take on the dynamic future that lies ahead.

Siemens PTI and Siemens Power Academy can help you better understand and address the growing system pressures including: renewable interconnection, infrastructure investments, compliance training, microgrids, Smart Grid technology, and look for ways to effectively manage the impacts of retiring generating units, the mounting pressure on nuclear assets and the growing need to meet renewable portfolio standards.

The need has never been greater for excellent energy related training and development programs to impart knowledge. Siemens responds to that need by providing training, education, workshops and thought leadership through the Siemens Power Academy.

Siemens responds

Our goal is to help our customers understand and address issues related to the successful and reliable operation of the grid. We cover the physical, technological and environmental challenges that help our customers build technical bench-strength and to ensure an adaptable, flexible and highly trained workforce.

With more than 40 years in consulting, software design and training for transmission and distribution (T&D), Siemens delivers education that can:

- Enhance industry knowledge
- Build new skills and capabilities
- Develop leadership skills
- Increase productivity
- Deepen your resume
- Advance your career

2012 highlights

- Training Locations - page 5
- Siemens Certifications - page 7
- NERC Certified Courses - page 24
- Non-technical ENERGY Series - page 22
- Non-technical Smart GRID Series - page 23

Contact us

Siemens Energy, Inc.
Siemens Power Technologies International
Siemens Power Academy
400 State Street, 3rd Floor
Schenectady, NY 12305
Telephone: +1 (518) 395-5005
Fax: +1 (518) 346-2777
Email: pti-edpro.ptd@siemens.com
Web: www.usa.siemens.com/energy/pti-education
# Table of contents

- Today’s challenge
  - Siemens responds
  - 2012 highlights
  - Contact us
- About the Academy
  - The authority on electric network systems
  - Our portfolio of services
- Regional office locations
- Certifications, curriculums and courses
  - Why Siemens for certification?
  - Associate certificate in power technology
  - Advanced certificate tracks
  - Expert level certification
  - Course identifiers and leveling numbers
- Course descriptions
  - Power DISTRIBUTION Engineering Courses (PDEC)
  - Power System ENGINEERING Courses (PSEC)
  - Power System SOFTWARE Courses (PSSC)
  - Power TRANSMISSION Engineering Courses (PTEC)
  - Siemens EQUIPMENT-based Training (SEBT)
  - Siemens ENERGY Professionals Series (SEPS)
  - NEW Siemens Smart GRID Professionals Series (SGPS)
  - Siemens NERC Certified Courses
  - Siemens System OPERATOR Training (SSOT)
  - Siemens PROTECTIVE Relay Training (SPRT)
- Course structure (NERC, CEUs and PDHs)
- Corporate and professional development programs
- Course schedule
- About Siemens PTI
  - Siemens PTI Network Consulting
  - Siemens PTI PSS® Software
  - Siemens PTI PSS® Support
  - About Siemens Energy, Inc.
- Terms and conditions
- Registration, payment and contact information
Siemens Power Academy TD – NA
Headquarters and regional course locations

Siemens Power Academy Transmission and Distribution – North America (Siemens Power Academy TD – NA) is the official training center for Siemens Energy’s North America operations. As one of several Siemens training centers around the world, we are dedicated to helping engineers meet the emerging challenges of today’s energy marketplace by developing new skills and knowledge.

Recognized leaders in power system engineering, including founding members of PTI such as Lionel Barthold, Robert Ringlee, F. Paul deMello, Al Wood, Wayne B’rells, Dale Hedman and Dag Reppen, helped lay the cornerstone of what has evolved into today’s Siemens Power Academy. For over 40 years, PTI engineers have passed their knowledge to the next generation of Power Academy instructors and students. Our engineering experts provide time-tested, value-driven and industry recognized course content that continues to produce results for our customers.

The authority on electric network systems

Since its founding in 1969, Siemens Power Technologies International (Siemens PTI) has been widely regarded as an authority on issues related to the growth, development and reliability of electric network systems throughout the world. With core strengths in probabilistic analyses and advanced dynamics modeling, we support the analysis of electrical power networks for generation, transmission and distribution systems, industrial plants and Smart Grids. Through our world-class network of consulting and software teams, Siemens PTI remains a leading supplier of software for utilities. Our PSS® Product Suite includes: PSS®E, PSS®E OPF, PSS®MUST, MOD®, PSS®OMDS and PSS®SINCAL.

Our portfolio of services

Siemens Power Academy has state-of-the-art training centers all over the world. We offer classroom, onsite and customized training services.

Classroom training

Learning with others is the fastest way to develop new skills and ideas. In our open enrollment courses, you will do just that – learn from our instructors and from other students – as you collaborate and problem solve. Our classroom courses operate throughout the calendar year at our eight North America training locations. On the following pages of this catalog, you will find multiple course listings, convenient schedules and our regional training locations. Bringing our instructors closer to you, our classroom training offers the best value for your money. Class schedules are published each fall in this, our annual education and training catalog, and updated regularly on our registration website.

Onsite and customized training

All of our classroom training courses are also available for onsite delivery. Whether you have a group of engineers in need of standard classroom training or you need customized content to meet specific learning objectives, we can design a course to meet your needs. Onsite training helps minimize travel costs and reduces time away from home, making onsite training an economical option for larger groups. Additionally, onsite training can focus on system or regionally specific requirements.

Practical workshops at regional users group meetings (PSS® Product Suite UGMs)

Sometimes a few hours with an expert may be all that you need. In addition to our classroom and onsite programs, we offer workshops at our annual regional and international user group meetings (UGMs). These half-day workshops are focused on specific software topics and offer expert guidance to help you achieve better results. Intended for more seasoned users, these workshops start with what you already know and share the how-to’s and what not-to’s.

Certification programs

As power system programs have faded from the academic landscape, now more than ever, engineers need to acquire and demonstrate knowledge in power system engineering fundamentals, design and application. Our certification programs provide learning pathways and focus course content to prepare students for advancement.
Siemens Power Academy TD – NA
Headquarters and regional course locations

Regional offices

To serve our customers in their regional control areas, we have expanded our regional office footprint in the United States and Canada. This expansion has allowed Siemens PTI and Siemens Power Academy to more effectively serve regional ISO/RTO areas. By bringing our courses closer to our customers, we help reduce time and travel expenses, and we are able to relate training concepts to regional issues. This creates a unique learning environment where students can network with peers and share experiences with companies in the local control area, as well as the rest of the world.

Siemens PTI – California*
Siemens Energy, Inc.
Siemens Power Technologies International
1350 Shorebird Way
Mountain View, CA 94043-1338 USA

Siemens PTI – Canada
Siemens Canada Ltd.
Siemens Power Technologies International
1550 Appleby Line
Burlington, ON L7L 6X7 CANADA

Siemens PTI – Colorado
Siemens Energy, Inc.
Siemens Power Technologies International
7810 Shaffer Parkway, Suite 100
Littleton, CO 80127 USA

Siemens PTI – Florida
Siemens Energy, Inc.
Siemens Power Generation, Inc.
4400 Alafaya Trail
Orlando, FL 32826-2399 USA

Siemens PTI – Germany
Siemens Power Academy TD
Humboldtstrasse 59
90459 Nürnberg, Germany
td.power-academy.energy@siemens.com

Siemens PTI – Minnesota
Siemens Energy, Inc.
Siemens Power Technologies International
10900 Wayzata Boulevard, Suite 400
Minnetonka, MN 55305 USA

Siemens PTI – New York
Siemens Energy, Inc.
Siemens Power Technologies International
400 State Street
Schenectady, NY 12305-1058 USA

Siemens PTI – North Carolina
Siemens Energy, Inc.
Siemens Power Transmission and Distribution (SPTD)
7000 Siemens Road
Wendell, NC 27591 USA

Siemens PTI – Texas
Siemens Energy, Inc.
Siemens Power Technologies International
4920 Westway Park Boulevard
Houston, TX 77041 USA

Global course offerings
In addition to our North American Training Center, Siemens and Siemens Power Academy offer a variety of professional training programs worldwide. Courses in power generation, wind, solar, distribution and transmission are offered at more than 31 training centers around the world.

Contact us and we'll help you find what you are looking for.

Siemens Power Academy
Email: pti-edpro.ptd@siemens.com
Phone: +1 (518) 395-5005
Web: www.usa.siemens.com/energy/pti-education
International Website www.siemens.com/energy/power-academy-td
Why Siemens for certification?

The Siemens Power Academy has long been recognized as the authoritative source for advanced training in power system engineering. Each year we provide training to more than 1,000 students from 90 countries across the globe with the goal of teaching meaningful content that supports the professional development of the engineering workforce. Our certification program was borne from our experience, passion and commitment to building and developing the talents of this industry’s workforce to create a sustainable future.

Global leaders in power system engineering teach all the courses that make up our certification programs. These programs were designed to provide students with a series of interrelated and progressively paced courses to equip students with the skills and knowledge needed to address today’s issues, as well as tomorrow’s challenges. These skills, in turn, will position participants to advance their careers, and to rank among the most accomplished engineers in this field.

Join the distinguished ranks of the Siemens Power Academy alumni.

How do certification programs work?

Siemens Certification can be earned at the Associate, Advanced and Expert levels. For each certification level, students must complete a series of required and/or elective courses.

At the conclusion of each course, students validate their knowledge through a course certification exam. These exams are administered online through our Learning Management System (LMS). Upon completion of all requirements, students are awarded a Certification in Power Technology, Power System Technology, Distribution Systems Technology, or PSS®E Network Planning and Analysis from Siemens Power Academy TD – NA.

Logically sequenced, interrelated and taught using real-world examples, each certificate level builds on the one before it in a hierarchy of skills and knowledge.

Why certify your skills?

As power engineering programs disappear from the academic landscape and experienced mentors retire from the industry, there are fewer and fewer resources from which power engineers can learn. Moreover, as system requirements become increasingly more complex, engineers who participate in rigorous training and certification programs will be in exceptionally high demand at the world’s leading utilities and system operators.

At Siemens Power Academy, you will learn from some of the best minds in power system engineering. The resulting certification will enhance your path to productivity, add depth to your understanding of the field, and increase the demand for your skills in the global job market.
Certifications, curriculums and courses

Siemens certifications

**Associate level** certification provides foundational coursework for engineers who are in their first few years of employment or transitioning from a technical, mechanical or civil engineering field. Upon completion of the required or elective coursework and associated assessments, students should be able to perform work under direction of their supervisor while translating, interpreting and extrapolating key concepts, methodologies, principles, theories and industry practices. This level of certification positions candidates for advancement and prepares them for more challenging work assignments as they develop in their positions.

**Advanced level** certification can be achieved in three different concentrations:
- Distribution Systems Technology
- Power Systems Technology
- PSS®E Network Planning and Analysis

It is recommended that participants seeking to complete the Advanced Level Certificate either have an electrical engineering degree with a concentration in power or have achieved the Associate Level Certificate. Upon completion of the required coursework and assessments, graduates of this program should be able to solve practical problems, work independently and apply engineering principles effectively as they become productive contributors in their organization.

**Expert level** certification is typically sought by more experienced professionals. Upon completion of an Advanced Level Certificate and the required coursework and assessments at the Expert Level, participants should be able to perform complex technical tasks independently, mentor and advise others on the performance of these tasks, evaluate, synthesize and communicate abstract concepts and make judgments about information and validity of ideas.

The specific course requirements for each certificate and concentration are provided on the following pages.

For information on how we can help you get started toward achieving your certification, contact Siemens Power Academy today.

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**Qualification levels**

- **Associate level:**
  - **Objectives:** The participant can perform specific technical tasks under supervision as part of his/her professional routine.

- **Advanced level:**
  - **Objectives:** The participant can independently perform technical tasks as part of his/her professional routine and can develop necessary solutions on his/her own.

- **Expert level:**
  - **Objectives:**
    - The participant can independently perform complex technical tasks and is able to communicate solutions to third parties for implementation.

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Professional experience

- > 5 Years
- > 2 Years
- > 1 Year
Associate Certificate in Power Systems Technology

- **PSEC 515**: Project Management for Power System Engineers (or Elective) + Exam
- **PDEC 500**: Power Distribution Engineering (NERC) + Exam
- **PTEC 500**: Overhead Transmission Line Design + Exam
- **PSEC 505**: Introduction to Power Flow Analysis with Applications (NERC) + Exam

To Advanced Level Certification

- **Advanced Certificate in Power Systems Technology**
- **Advanced Certificate in Distribution Systems Technology**
- **Advanced Certificate in PSS®E Network Planning and Analysis**
Certifications, curriculums and courses

Advanced Certificate Tracks

From Associate Level Certification

- **PDEC 563** Understanding System Losses for Utility Management (NERC) + Exam
- **PDEC 591** Substation Engineering and Operations + Exam
- **PDEC 630** Low-voltage Secondary Networks + Exam
- **PDEC 540** Distribution Transformers, Grounding and Protection (Or PSEC 505) + Exam

Advanced Certificate in Distribution Systems Technology

- **PSEC 510** Analytical Methods for Voltage Control and Reactive Power Planning (NERC) + Exam
- **PSEC 535** Power System Studies for Wind Integration (NERC) + Exam
- **PSEC 600** Introduction to Power System Dynamics (NERC) + Exam
- **PSEC 635** Power System Scheduling and Market Operations (NERC) + Exam

Advanced Certificate in Power Systems Technology

- **PSSC 500** PSS®E – Power Flow and Steady State Analysis (NERC) + Exam
- **PSSC 550** PSS®E – Dynamic Simulation + Exam
- **PSSC 710** PSS®E – Advanced Power Flow + Exam
- **PSSC 715** PSS®E – Advanced Dynamic Simulation (Or PSSC 700 Elective) + Exam

Advanced Certificate in PSS®E Network Planning and Analysis

To Expert Level Certification

- **PSEC 635** Power System Scheduling and Market Operations (NERC) + Exam

Siemens Power Academy TD – North America is proud to award this Advanced Certificate in recognition of their commitment to professional development in the field of:

- Distribution Systems Engineering
- Transmission Systems Engineering
- PSS®E Network Analysis and Planning Studies

To help you quickly identify courses in a particular area of study, Siemens Power Academy courses are grouped by course identifiers into one of the following categories:

- **Power Distribution Engineering Courses (PDEC)** – page 12
- **Power System Engineering Courses (PSEC)** – page 14
- **Power System Software Courses (PSSC)** – page 17
- **Power Transmission Engineering Courses (PTEC)** – page 20
- **Siemens Equipment-based Training Courses (SEBT)** – page 21
- **Siemens System Operator Training Courses (SSOT)** – page 24
- **Siemens Protective Relay Training Courses (SPRT)** – page 25
- **Siemens Energy Professionals Series (SEPS) Courses** – page 22
- **NEW - Siemens Smart Grid Professionals Series (SGPS) Courses** – page 23

To be effective, training programs must take into account the needs and background of the attendees. Traditionally our courses were designed primarily for electrical engineers and taught at the graduate level of instruction (500-700) and many still are. However, with the integration of industry professionals working outside the engineering domain, there is a growing need for all stakeholders to better understand the entire power conversion chain.

### Expert Level Certification

**For the Expert Level Certification, select four elective courses from the following list:**

- PSEC 530 PSS®E - Modeling of Wind and Solar Farms
- PSEC 638 Power System Reliability
- PSEC 655 PSS®E - Applications for Power Electronics in Transmission Systems (HVDC, FACTS) and Wind Power (PETS)
- PSSC 600 PSS®E and Python™ - Integrating for Workflow and Automation
- PSSC 700 PSS® MUST - Introduction to Using System Transmission Data for Decision Making
- PSSC 720 PSS®E - Model Writing for User Defined Models (UDMs)
- PSSC 725 PSS® MUST - Advanced MUST Automation and Decision Making (NEW)
- PSSC 790 PSS®E and Reactive Power Planning
- PTEC 620 Advanced Transmission Planning with Modern Network Analysis Tools (PSS®E, PSS®MUST, PSS®E OPF)
- PTEC 635 PSS®E for Transmission Reliability Studies

**From Advanced Level Certification**

**Course 1** + Exam  
**Course 2** + Exam  
**Course 3** + Exam  
**Course 4** + Exam

Siemens Power Academy TD – North America is proud to award this Expert Certificate in recognition of their commitment to professional development in the field of: Power Systems Technologies


**Expert Certificate**

Your Name  
Location, Date

Renee W. Devine  
Senior Manager

Brian Gemmell  
General Manager
Certifications, curriculums and courses

To help you quickly identify courses in a particular area of study, Siemens Power Academy courses are grouped by course identifiers into one of the following categories:

Power DISTRIBUTION Engineering Courses (PDEC) – page 12
Power System ENGINEERING Courses (PSEC) – page 14
Power System SOFTWARE Courses (PSSC) – page 17
Power TRANSMISSION Engineering Courses (PTEC) – page 20
Siemens EQUIPMENT-based Training Courses (SEBT) – page 21
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To be effective, training programs must take into account the needs and background of the attendees. Traditionally our courses were designed primarily for electrical engineers and taught at the graduate level of instruction (500-700) and many still are. However, with the integration of industry professionals working outside the engineering domain, there is a growing need for all stakeholders to better understand the entire power conversion chain.

To respond to this need, Siemens Power Academy is expanding our portfolio of courses to include two non-technical professional series (SEPS and SGPS). We have also added 10 NERC-certified courses to help operators and control room support staff meet annual compliance and training requirements.

We will continue to grow our portfolio in partnership with our other Siemens businesses in Siemens Energy and our new sector Siemens Infrastructure & Cities, as well as with our colleagues at the Power Academy in Nürnberg, Germany, to provide additional courses for engineers and electrical field technicians.

Our courses are organized by levels to help you identify the right level of difficulty based on your skills and experience. Leveling numbers begin at 300 and advance to the 700 level. These leveling numbers will help you quickly navigate the level of difficulty or prerequisite knowledge required for that course.

300 level courses are designed to give non-technical professionals a thorough understanding of the issues related to the energy sector, its various business drivers, tools and models and how to apply them in day-to-day business. These courses provide valuable knowledge for any industry professional whose work requires a basic understanding of the grid.

400 level courses are designed for the new employee at the associate level to provide foundational knowledge needed to advance to the next level. These courses include content that reintroduces the participant to theories, calculations and fundamental concepts covered in undergraduate EE programs, system operator training and application-based courses for field service equipment. These courses may be eligible for transfer credit at participating universities.

500 level courses are designed for the career employee at the advanced level to introduce and relay advanced concepts and apply technology or software tools and solutions. These courses may be eligible for transfer credit at participating universities.

600 to 700 level courses are designed for the more experienced career employee at the advanced to expert level to further advance knowledge and application of technology and software solutions. These courses may be eligible for transfer credit at participating universities.

Siemens Power Academy
Email: pti-edpro.ptd@siemens.com
Phone: +1 (518) 395-5005
Web: www.usa.siemens.com/energy/pti-education
Power DISTRIBUTION Engineering Courses (PDEC) provide engineers and technicians with fundamental and advanced knowledge to understand and operate efficient distribution systems. From the basic knowledge of system configuration to comprehending power quality, system losses, power factor, line rating, grounding, protection, transformers and substation design, participants will gain practical and highly applicable knowledge and skills.

**PDEC 500**

Power Distribution Engineering

- **CC**
- **UPDATED**
- **3 days**
- **1.8 CEUs**

Do you want a better understanding of the basic concepts of electrical engineering? Are you interested in learning more about forecasting or the theory behind analysis and reliability? If so, then PDEC 500 is for you! This course examines the key concepts of power distribution engineering. Distribution system configurations, equipment use and the advantages and disadvantages of each are discussed. Topics include power systems, voltage regulation reliability, voltage drop, power quality, power factor correction and capacitor applications. This course will improve your understanding of distribution system insulation coordination and surge arrester applications that provide overvoltage protection from events such as switching and lightning surges. Also included are discussions on methods used in the steady state analysis of AC circuits as applied to power distribution systems including: linear circuit elements, complex numbers, matrices, network solution methods, three-phase power systems, the per unit system, symmetrical components and fault currents. This is a great course for new engineers, technicians from industrial applications and operations or Smart Grid application engineers who need to better understand the distribution system components, limits and risks.

**PDEC 540**

Distribution Transformers, Grounding and Protection

- **CC**
- **UPDATED**
- **3 days**
- **1.8 CEUs**

This course presents an overview of factors to consider when selecting and applying pole-top and pad-mounted distribution transformers. This course covers types of primary and secondary systems, allowable connections, connections to be avoided, loading equations for sizing transformers with single- and three-phase load, regulation and secondary fault currents, voltage imbalance and unsymmetrical loading, peculiarities with open-wye, open-delta banks, phase-to-ground voltages in ungrounded secondary systems, floating wye-delta bank, switching overvoltages, ferroresonance and tank heating, and fundamentals of fuse application to pole-top units. Also covered is distribution system grounding: types and characteristics, currents and overvoltages during faults. Overcurrent protection devices and applications are also addressed: relays, circuit breakers, reclosers, sectionalizers, switches and fuses.

**PDEC 563**

Understanding System Losses for Utility Management

- **UPDATED**
- **3 days**
- **1.8 CEUs**

Are you aware that the greatest reduction in losses comes from how you manage the reactive power in your system? Are you looking to identify concentrated and unacceptable system losses? By attending this course you will learn the role of utility management in assessing the effects of system losses from both an operations and a planning perspective. This course provides transmission and distribution planning engineers, rate design engineers from utilities, and regulatory commissioners with methods for effectively modeling, analyzing, allocating and reducing losses. Topics include loss evaluation techniques, methods for simplifying the loss calculation, principal causes of losses (transformers and lines) and program requirements to reduce them effectively. Case study provided.

**PDEC 591**

Substation Engineering and Operations

- **CC**
- **UPDATED**
- **3 days**
- **1.8 CEUs**

Would you like to learn more about substation design, operation and equipment planning?

The objective of this course is to provide participants with an understanding of the electrical engineering requirements for new substations and expansions of existing stations. Specific topics include: station design parameters, bus arrangements, major equipment specifications, electrical clearances, above-ground structures and line/station overvoltage protection.
PDEC 620
Distributed Generation and Energy Storage Applications on Power Systems
Presented by Nova Energy Specialists

- 2 days
- 1.2 CEUs

Distributed generation is becoming a key component of current and future energy strategy in the U.S. and throughout the world. This course provides a detailed review of dispersed photovoltaic, solar, wind, fuel cell and conventional dispersed generation technologies, as well as the theory of operation, economic factors and technical impact on utility distribution systems. Topics include interfacing and optimal location of dispersed generation, protective relaying and system interconnection issues, islanding, voltage flicker effects, power quality effects, design, location and sizing. Intended for engineers involved in solar, wind, fuel cell, ICE, MicroTurbine and other generation technologies.

PDEC 655
Distribution Automation and Analysis for the Smart Grid

- 4.5 days
- 2.7 CEUs

Electric utility engineers need to advance their knowledge of DMS (Distribution Management Systems) to take advantage of Smart Grid applications and fully integrate AMI (Advanced Metering Infrastructure) technology. This course will trace the residential and commercial meter installation growth in North America, discuss how AMI can be used to optimize system performance and reduce losses, and help participants better understand DMS meter data management requirements. In addition to case studies including Siemens Metering Services and E-Meter solutions, students will see examples of Siemens distribution planning software, PSS®SINCAL and how the use of meter data in distribution planning supports decision making for protection schemes, enabling better use of distribution engineering resources.
Power Systems ENGINEERING Courses provide engineers with a comprehensive range of topics in power systems engineering such as steady state analysis, dynamic modeling, reliability, protection, power markets and system scheduling and operation. PSS®E software examples are provided in many of these courses: however, for specific PSS® Product Suite-related instruction, please refer to the PSSC course descriptions on page 17.

**PSEC 505**

**Introduction to Power Flow Analysis with Applications**

- 4.5 days
- 2.7 CEUs

Power flow, or load-flow study, is an important study tool in power system analysis. If you need to understand or refresh your skills in power flow behavior then this is the course for you. It covers load-flow training using PSS®E software, where you will learn to explain and calculate apparent power, active power, reactive power and power factor in single-phase AC circuits and balanced three-phase power systems. As a NERC-certified course, this is a great introduction for operators and engineers alike as it addresses power flow techniques for power system steady state analysis with an emphasis on current practices and applications. PSEC 505 covers applications such as contingency analysis, linearized direct current load-flow and voltage collapse, as well as discussion of transfer limit analysis and system impact studies. You will learn both theory and practice for modeling power system components and load-flow solution techniques, including hands-on examples using PSS®E.

**PSEC 510**

**Analytical Methods for Voltage Control and Reactive Power Planning**

- 4.5 days
- 2.7 CEUs

Are you a power system planner or operator concerned with voltage stability? In this course you will receive a simulation and hands-on learning experience as we explain the concepts of voltage issues and reactive power shortage including voltage instability, voltage collapse, cascading outages, system low-voltage condition, slow and fast system voltage dynamics and reactive compensation. At the conclusion of this class, students will use analytical methods and tools to analyze and solve system voltage problems and plan reactive compensation.

**PSEC 515**

**Project Management for Power System Engineers**

- 2 days
- 1.2 CEUs

Are you implementing studies or projects to manage critical activities and processes? Project teams face challenges such as aggressive deadlines, scope creep, communication breakdowns and financial constraints. It takes solid project management skills and knowledge to successfully manage these challenges and achieve project success. This course discusses and examines tools used in the project management process for scheduling and controlling the types of projects a power system engineer would encounter.

**PSEC 530**

**PSS®E – Modeling of Wind and Solar Farms**

- 3 days
- 1.8 CEUs

Are you analyzing the impact of wind and solar farms on power systems in your planning studies? Do your modeling capabilities meet the growing demands for incorporating renewables into your system? This course provides you with techniques and hands-on experience for modeling and running interconnection studies for wind and solar farms. A general summary of specific wind turbine model packages developed by Siemens PTI for PSS®E will also be given to highlight the latest developments and increase awareness of model contents and availability.

This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
### Power Systems Engineering Courses (PSEC)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSEC 535</td>
<td>Power System Studies for Wind Integration</td>
<td>2.7 CEUs</td>
<td>4.5 days</td>
</tr>
<tr>
<td>PSEC 600</td>
<td>Introduction to Power System Dynamics</td>
<td>2.7 CEUs</td>
<td>4.5 days</td>
</tr>
<tr>
<td>PSEC 635</td>
<td>Power System Scheduling and Market Operations</td>
<td>1.8 CEUs</td>
<td>3 days</td>
</tr>
</tbody>
</table>

Are you a power system engineer responsible for the planning and operational impacts of integrating wind generation? Do you want to build your understanding of policies to sustain and grow this largely untapped energy source?

This NERC certified course will provide you with the ability to understand and describe the drivers of the wind industry as well as identify the effects they have on transmission operation. The advantages of utilizing the PSS®E modeling tool to input wind facility modeling data into the typical EMS will be discussed. A variety of topics related to current practices and industry trends are covered including: technical considerations for integrating large amounts of wind turbine generation into the power system; interconnection requirements, including low-voltage ride through (LVRT), ramp rate limitations, supply of ancillary services for frequency and voltage control; turbine types and technical capabilities for participating in the active power and ancillary services markets; steady state and voltage stability impacts of integrating large amounts of wind turbine generation; dynamic studies required for the integration of wind turbine generation, including disturbance selection, stability results review and discussion of remedies; and market and operational impacts of wind integration.

If you want a broader understanding of energy markets and how they relate to operations, then this course is for you. As a NERC certified course, PSEC 635 provides the link between physical system components and the market. It covers a variety of topics including market operations, economic dispatch, unit commitment, automatic generation control, operating security and interchange evaluation, and power systems state estimation. You will receive instruction on how to describe the different power generation sources, the various measures of power plant efficiencies and how to plot these measures from plant test or design data. This course includes hands-on examples using PSS®E. At the completion of this class, students will have a basic understanding of the energy management and control center activities of economic dispatch, unit commitment, electricity market operations, automatic generation control, contingency analysis and state estimation. This is a great course for technicians, operators, economists, engineers and most industry professionals.

This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
### PSEC 638
**Power System Reliability**
- **CC**
- **2 days**
- **1.2 CEUs**

Are you a stakeholder in an electric power system? Do you have a mastery of the objectives, costs and benefits of power supply quality and system reliability? This course will provide participants with an organized review of the power system fundamentals, define the reliability relationship, and discuss traditional and modern methods to improve reliability. The course concludes with a discussion on the economic characteristics of reliability and if it is possible to find a qualified level of reliability that is economically acceptable.

### PSEC 640
**Fundamentals of Protective Relaying**
- **3 days**
- **1.8 CEUs**

Do you have an interest in expanding your practical understanding of protective devices and systems? Are you looking for real-world knowledge related to protection in generation, transmission, sub-transmission or distribution systems? This course provides a comprehensive introduction to system protection. Topics include protection principles, physical and operating characteristics of protective devices, and protective relaying applications for generation, transmission and distribution systems. This course will be valuable to engineers just entering the system protection field and to those seeking a better understanding of the impact of protective systems on the power system network.

### PSEC 650
**Power System Stability and Stabilizer Tuning**
- **3 days**
- **1.8 CEUs**

Do you face the challenge of maximizing power transfer capability and minimizing new transmission expansion, all while not sacrificing stability? Are you familiar with Power System Stabilizer (PSS) conditions? This course provides a thorough analysis of dynamic stability problems and control analysis tools used for PSS tuning. Theoretical and practical aspects of PSS commissioning and tuning are examined. Analysis of PSS input signals, including: electrical power, speed, frequency and accelerating power are covered. You will practice tuning a PSS and evaluating its performance using PSS®E.

### PSEC 655
**PSS®E – Power Electronics in Transmission Systems (HVDC, FACTS) and Wind Power (PETS)**
- **4.5 days**
- **2.7 CEUs**

If you work for a utility or if you are a power system operator or planner, you are likely faced with the challenges of efficiently and economically delivering power. To address these challenges, you must be prepared to embrace new technology and applications. This course presents principal applications of modern power electronics in transmission systems. It includes discussions on HVDC technology (two-terminal and multi-terminal transmissions, back-to-back substations, light applications of HVDC and capacitor-commutated HVDC terminals), various FACTS devices (STATCOM, SCCC, UPFC, IPFC, SMES, BES, etc.) and alternative energy sources including an emphasis on renewables, such as wind power turbines and plants. You will be able to describe and analyze controls and their impact on power systems and discuss PSS®E modeling in load-flow and dynamics simulations. Comprehensive hands-on examples using PSS®E are included to help you understand and apply these technologies in system planning and operational practice.

*This course has been certified for NERC Continuing Education Hours (CEUs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).*
Power System SOFTWARE Courses (PSSC)

Power System SOFTWARE Courses provide engineers with a comprehensive range of topics and instruction on the use and application of PSS® Product Suite in transmission, distribution, and industrial system planning and analysis, modeling and operational data management.

PSSC 500

PSS®E – Power Flow and Steady State Analysis

- **BESTSELLER**
- **NEC**
- **CC**
- **NEW**
- **4.5 days**
- **2.7 CEUs**

Are you required to interpret power flow results (convergence, divergence, non-convergence)? Do you need to understand the causes and event sequence of voltage collapse and apply data checking functions in PSS®E to identify power flow modeling issues? This course provides the fundamental PSS®E software training to help novice users navigate the interface and gain hands-on experience. More than an application course, PSSC 500 will acquaint you with most program functions in sufficient detail to begin study work relevant to power flow and fault analysis. Upon completion of this course, you will understand PSS®E functions and their uses and have the ability to perform various power flow analyses. Topics include power flow modeling data, one-line diagrams, power flow solutions and reports, program automation, response files, IPLAN and Python™, contingency and transfer limit analysis and more.

PSSC 525

PSS®E – Fast-track Steady State and Dynamics

- **NEC**
- **4.5 days**
- **3 CEUs**

Sometimes you need a crash course to understand the breadth and depth of this powerful software’s capabilities to efficiently transition over to PSS®E. This course is five full days of instruction that is fast-paced and packed with the basic components of PSSC 500 Power Flow and Steady State and PSSC 550 Dynamic Simulation. This course provides a fast-track overview so that you can experience the full functionality of the PSS®E software. Follow-on study in both courses (PSSC 500 and PSSC 550) is highly recommended to fully understand, practice and use the software to complete studies and simulations. This is an “On-Demand” course that is not part of our regular schedule. Contact the Power Academy for additional details on scheduling this course for your team.

PSSC 535

PSS®E – What’s New in PSS®E Version (33)

- **UPDATED**
- **3 days**
- **1.8 CEUs**

To keep pace with the demand for reliable power and ever-expanding complex networks, our PSS®E software team responds to industry needs by adding features and making continuous improvements to our software. This course provides users with an introduction to new program features and functionality based on the latest version of PSS®E. PSSC 535 is a great way to quickly refresh your knowledge and gain experience with new program features.

This is an “On-Demand” course that is not part of our regular schedule. Contact the Power Academy for additional details on scheduling this course for your team.

PSSC 550

PSS®E – Dynamic Simulation

- **BESTSELLER**
- **4.5 days**
- **2.7 CEUs**

Different types of disturbances can cause your system to behave in certain ways. Do you know how to analyze your system response by running a dynamic simulation? If not, this course will help you understand how your power flow indicates your system status in steady state and how dynamic simulation tells you how your system transitions from one status state to another. This course covers data development and input for dynamics, initial system setup and checkout, running dynamic simulations, plotting results and more. This course requires previous knowledge of PSS®E, as it is fast-paced and includes hands-on exercises using PSS®E.

Siemens Power Academy

Email: pti-edpro.ptd@siemens.com
Phone: +1 (518) 395-5005
Web: www.usa.siemens.com/energy/pti-education

This course has been certified for NERC Continuing Education Hours (CEH). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
The Common Information Model (CIM) standard was developed to exchange information in the electric power industry and was officially adopted by the International Electrotechnical Commission (IEC) for use in transmission and distribution. This course introduces you to CIM and provides instruction on how this standard protocol is used for data exchange among the various applications that operate in the electric power industry such as energy management systems, distribution management systems, planning, outage management systems, metering, asset management and enterprise resource planning. This course aims to provide an understanding of how CIM enables planners and operators easier access to both operational and planning data addressing the operational and planning model exchange needs of the industry.

This course will teach you how to efficiently calculate:
- Transaction impacts on transmission areas, interfaces, monitored elements or flowgates
- Generation re-dispatch factors for relieving overloads
- Incremental transmission capability (FCITC)
- FCITC variations with respect to network changes, transactions and generation dispatch
- The impact of transmission element outages on power flow by both DC and AC contingency analysis.

This course is designed for more experienced engineers. Examples such as synchronous generators, excitation systems, prime movers, wind turbines, HVDC and FACTS devices, and advanced contingency and reliability analysis are used. Students will write samples of PSS®E models or customize an existing model. It is recommended that users have experience writing their own PSS®E dynamic models or have reviewed an introductory PSS®E dynamic simulation model. For more information, please see http://www.pss.com/downloads/PSSSoftware/ce15/012415.pdf.

This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
Power System SOFTWARE Courses (PSSC)

PSSC 715 CC
PSS®E – Advanced Dynamic Simulation
■ 4.5 days  2.7 CEUs
Running simulations and dynamic modeling require different skill sets and knowledge. If you are ready to learn advanced analysis of system stability and dynamics, then this course is for you. Redesigned to include more hands-on exercises, this course provides an integrated learning approach; you will be challenged with study examples including interconnection of conventional power plants and wind farms, voltage stability and dynamic reactive power compensation, and frequency control and underfrequency load shedding. These examples and exercises are designed to focus on aspects of dynamic modeling such as synchronous generators, excitation systems, prime movers, wind turbines, HVDC and FACTS devices, and loads. This is a challenging course designed for more experienced engineers.

PSSC 720 CC
PSS®E – Model Writing for User Defined Models (UDMs)
■ 3 days  1.8 CEUs
Do you need a new manufacturer device modeled? Do you need to know how to analyze the models dynamic performance? This advanced training course for PSS®E users is designed for those engineers who want to write their own PSS®E dynamic models or customize an existing model. It covers the description of the PSS®E simulation program structure, indexing, variables and arrays. This course covers structuring user models, equations for typical model blocks using the FORTRAN and FLECS program languages, and advanced uses of CONEC and CONET. Students will write samples of PSS®E dynamic simulation models.

PSSC 725 CC
PSS®MUST – Advanced MUST Automation and Decision Making
■ 4 days  2.4 CEUs
Have you been waiting for an advanced course to learn and use advanced PSS®MUST automation and functionality? Many PSS®MUST users know and use the AC/DC features of PSS®MUST regularly, but very few of them use PSS®MUST functions such as transaction scheduling, sensitivity analysis, PSS®MUST Automation Block (new feature) or use Python™ to automate or post process PSS®MUST results. Building upon our bestselling PSSC 700 course, this NEW four-day advanced course will instruct you how to automate processes and increase your efficiency using PSS®MUST. Users are welcome to bring their system’s load-flow data to class to use in course assignments.
At the time of the printing of this publication, this course was in development. An announcement with scheduled dates and locations will be made to the PSS®E and PSS®MUST community once available.

PSSC 730
PSS®SINCAL – Basic Course
■ 2 days  1.2 CEUs
Participants will acquire basic knowledge on how to use the net planning program PSS®SINCAL for basic calculations on topics related to load-flow and short circuit. Students will participate in hands-on exercises using PSS®SINCAL. This course is valuable to engineers and service technicians who work in operation, planning and design of power systems.

PSSC 790
PSS®E and Reactive Power Planning
■ 3 days  1.8 CEUs
Do you need to reduce your system’s vulnerability? Plan your reactive power support! Utility engineers who conduct studies with PSS®E must understand the fundamental concepts of power system behavior, as well as know how to execute the many complicated routines within the program. This course is great for the experienced PSS®E user who needs to increase his/her analytical skills related to voltage control issues in steady state and dynamic simulation.

NERC
continuing education
This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).

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The Power TRANSMISSION Engineering Course (PTEC) designation identifies special topics related to the electrical transmission system equipment, infrastructure, reliability, design, rating requirements and power flow constraints. Courses cover topics ranging from the selection and maintenance of equipment to advanced discussions on the use of transmission planning tools to effectively evaluate power flow constraints and the available methods to help alleviate power flow problems. These courses analyze the major technical, economical and institutional feasibility issues related to overhead line uprating, and also discuss electrical, structural and environmental aspects of line uprating.

PTEC 411
Transformer Diagnostics
■ 3 days 1.8 CEUs

If aging transformers and new equipment purchases, along with load growth and the need to create a livable maintenance plan keep you awake at night, this course is for you. This course provides power transmission and distribution systems engineers (particularly those who need to understand the concepts related to transformer specifications, design review, application and testing), with the necessary information to address the challenges our industry faces when it comes to managing these important assets. Specific topics address issues related to the continuous assessment of these costly and essential assets. This course also covers new industry challenges such as the introduction of online monitoring systems, new synthetic and vegetable oils, and the recurrence of corrosive sulfur in oil as a potential cause of major transformer failures.

PTEC 500
Overhead Transmission Line Design
■ 4.5 days 2.7 CEUs

Civil, mechanical and electrical engineers need to understand how transmission line design and pole placement help ensure the lowest cost method of providing for the transmission of electrical power. With the integration of renewables – often far from load centers – the economics of transmission line design, planning, capacity and uprating are important for any engineer to understand. This course provides you with information on major line components selection and discusses the economics, electrical, mechanical, thermal and environmental constraints of each. This course explores insulation and conductor selection methods. PLS-CADD™ software application will be discussed.

PTEC 620
Advanced Transmission Planning with Modern Network Analysis Tools (PSS®E, PSS®MUST and PSS®E OPF)
■ 4.5 days 2.7 CEUs

Do you want to understand how to use the latest analytical and simulation technologies available in the PSS® Product Suite? Understanding the practical applications and expert methods of using the PSS® Product Suite is at the heart of this course. Learn from our transmission planning and PSS® Product Suite experts on how to use the latest analytical and simulation technologies including: PSS®E, PSS®MUST and PSS®E OPF for transmission planning. Experience the benefits of learning by doing in this hands-on course designed to demonstrate concepts and help you implement advanced planning methods and techniques to get quick and reliable planning study results. Topics include planning criteria, planning under uncertainty, assessment of reliability schemes, thermal capacity expansion, reactive capacity requirements, transfer limit analysis, dynamic modeling and stability analysis for future transmission systems and stability countermeasures, and database requirements for transmission planning.

PTEC 635
PSS®E for Transmission Reliability Studies
■ 3 days 1.8 CEUs

An aging grid, combined with new technology and operational demands will require fresh thinking in terms of performance measurements. Utilities, including investor-owned, public and municipals/cooperatives, need to understand how their systems perform relative to the industry, geographic regions, and their own historical performance in order to make corrective actions and plan for future investments. This course provides an overview of transmission reliability and discusses assessment tools and methods, criteria and practices, and deterministic and probabilistic measures. Students will gain hands-on experience in the use of PSS®E for transmission reliability analysis, including data setup, contingency enumeration process, solution engines, switching events, corrective actions, outage probabilities and customer-based indices. This is a great course for anyone involved in planning, operations, transmission transactions or transmission systems.

NERC

This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
Siemens EQUIPMENT-based Training (SEBT) Courses

Siemens EQUIPMENT-based Training (SEBT) courses are designed as maintenance training programs. Tailored to increase the knowledge of personnel responsible for the installation, operation and maintenance of this equipment, these courses emphasize practical, rather than theoretical training and provide a hands-on approach for attendees in problem-solving exercises.

SEBT 411
Transformer Diagnostics

- 3 days  
  1.8 CEUs

If aging transformers and new equipment purchases, along with load growth and the need to create a livable maintenance plan, keep you awake at night, this course is for you. This course provides power transmission and distribution systems engineers (particularly those who need to understand the concepts related to transformer specifications, design review, application and testing), with the necessary information to address the challenges our industry faces when it comes to managing these important assets. Specific topics address issues related to the continuous assessment of these costly and essential assets. This course also covers new industry challenges such as the introduction of online monitoring systems, new synthetic and vegetable oils, and also the recurrence of corrosive sulfur in oil as a potential cause of major transformer failures.

SEBT-ASM 212
BZO6/6C Breaker Maintenance

- 1.5 days  
  1.1 CEUs

If you are responsible for operation and maintenance of BZO6/6C oil power circuit breakers, then this course is for you. Topics covered include introduction to power circuit breakers, interrupter maintenance, power unit maintenance, ball valve/pilot valve maintenance, factory adjustment procedures, and upgrade and life extension solutions.

SEBT-ASM 312
Voltage Regulator

- 3 days  
  1.8 CEUs

Are you responsible for handling, installing and maintaining single-phase voltage regulators? If so, this course is designed to increase your knowledge of various control panel and regulator operations. The course includes hands-on instruction with 16 control panel stations and 11 regulator stations.

Interested? Let us know.

PDEC 421 – Understanding Medium-voltage Switchgear

PDEC 431 – Understanding Switching Devices and Switchgear Application

PTEC 430 – Introduction to High-voltage Switching Technology

PTEC 435 – Basics of High-voltage Switchgear Design

PTEC 450 – Operation and Maintenance of Air-insulated Switchgear

PTEC 455 – Operation and Maintenance of Gas-insulated Switchgear

PTEC 460 – Theory and Practice of Gas Insulated transmission Line (GIL) technology

This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
The Siemens ENERGY Professionals Series (SEPS) is a comprehensive professional development program designed to provide you with the knowledge and skills necessary to contribute to the evolution of the electric system. Whether you are an experienced professional or a transitioning engineer, understanding the physical, financial and technical aspects of the electric system is crucial for advancing your career.

### SEPS 305 – The Physical Grid

- **1.5 days**
- **0.9 CEUs/9 PDHs**

- The evolution of the electric system design
- The basics – who's who: Hertz, Faraday, Volta, Ohm, Watt and others
- An overview of the major grid components: generation, substation, transmission, distribution and metering
- Reliability and operations

### SEPS 315 – Managing Grid Projects

- **0.5 days**
- **0.3 CEUs/3 PDHs**

- Managing large power system projects
- Fundamentals of controls, scheduling, budget and scope
- Regulatory, environmental and long-term planning challenges.

### SEPS 320 – The Financial Grid

- **1 day**
- **0.6 CEUs/6 PDHs**

- The law of supply and demand
- Understanding the electricity value chain
- Regulation and deregulation of electric markets
- Roles and players: the financial grid organization chart – suppliers, customers and market participants and their economic drivers
- Market design: financial tools, risk mitigation and profit strategies
- Location-based pricing – market information systems
- Reliability and security issues related to system gaming and IT.

### SEPS 325 – The Future of the Grid

- **0.5 days**
- **0.3 CEUs/3 PDHs**

- Integration of renewables, electric cars, Smart Grids and CO2 neutral cities
- Financial issues, credit, derivatives and cap-and-trade
- Environmental challenges and NOx/SOx
- Social issues related to siting generation and transmission, and workforce issues
- Governmental initiatives affecting the growth of generation, transmission and distribution systems to meet future demand, and security and environmental challenges.

### SEPS 330 – Smart Metering and Smart Grids

- **0.5 days**
- **0.3 CEUs/3 PDHs**

- Smart Grids - the requirements of a modern distribution network
- AMR (Automatic Meter Reader)
- Energy IP – Meter Data Management
- Future of utility business models and smart meter solutions.

Developed by Siemens, the SEPS series provides training for professionals who want to deal with the complex changes that will enhance the system's performance, improve reliability and integrate renewables, and other green technology initiatives. Whether you are in customer service, finance, project management, or a transitioning civil or mechanical engineer, understanding the physical, financial and future drivers of the electric power grid will enable you to improve your valued contributions to your organization.

Join us for our Siemens ENERGY Professionals Series (SEPS) and learn more about The Grid – Physical, Financial and Future Drivers of the Power Grid.

**SEPS 400 – The Energy Professionals Series**

- **4 days**
- **2.4 CEUs/24 PDHs**

Easy registration for all five SEPS courses and includes a combined discounted price for SEPS 305, 315, 320, 325 and 330.

**SEPS 305 – The Physical Grid**

- **1.5 days**
- **0.9 CEUs/9 PDHs**

**SEPS 315 – Managing Grid Projects**

- **0.5 days**
- **0.3 CEUs/3 PDHs**

**SEPS 320 – The Financial Grid**

- **1 day**
- **0.6 CEUs/6 PDHs**

**SEPS 325 – The Future of the Grid**

- **0.5 days**
- **0.3 CEUs/3 PDHs**

**SEPS 330 – Smart Metering and Smart Grids**

- **0.5 days**
- **0.3 CEUs/3 PDHs**

This course has been certified for NERC Continuing Education Hours (CEHs). Courses denoted with a CC are included in one or more Certificate Concentrations (CC).
Siemens Smart GRID Professionals course series!

Developing a Smart Grid strategy is a complex endeavor. It is even harder when you do not know what a smarter grid really entails. The latest addition to our professional workshop series, the Siemens Smart GRID Professionals Series (SGPS) provides participants with an assessment of the critical infrastructure and the associated decisions required to make a smarter grid a reality.

Whether you are in development, customer service, finance, project management or a transitioning civil or mechanical engineer, understanding the concept of a Smart Grid will enable you to provide valuable contributions to your organization.

Join us for our NEW Siemens Smart GRID Professionals course series!

SGPS 420 – Defining Smart Grid Objectives, a Needs Assessment

- NEW -
- 0.5 days
- 0.3 CEUs/
- 3 PDHs

Like any large project, understanding where you are, where you are going and why you need to get there is part of preparing for the journey. This workshop focuses on defining common Smart Grid objectives and preparing a basic needs assessment in response to those objectives.

SGPS 430 – Understanding Distribution Systems and Grid Performance

- NEW -
- 0.5 days
- 0.3 CEUs/
- 3 PDHs

Once you have conducted your needs assessment, how will the grid perform in response to your plan? This workshop focuses on understanding the distribution systems, performance measures and outcomes in response to Smart Grid needs objectives.

SGPS 440 – Asset Management Capability Analysis and Grid Optimization

- NEW -
- 0.5 days
- 0.3 CEUs/
- 3 PDHs

This workshop focuses on understanding the importance of distribution equipment, system asset capabilities and the required maintenance to achieve Smart Grid objectives. Meters, monitors, sensors, reclosers, switchgear, fault detection, voltage optimization and capacitor communications will be discussed.

SGPS 450 – Smart Applications and Demand Optimization

- NEW -
- 0.5 days
- 0.3 CEUs/
- 3 PDHs

Distribution automation, AMI, Electric Vehicles, Home Energy Management (HEM) systems - what they are and how the information produced by these applications can lead to improved grid performance will be the focus of this discussion.

SGPS 460 – Communication Networks, Data Management and Grid Performance

- NEW -
- 0.5 days
- 0.3 CEUs/
- 3 PDHs

Grid communication was designed with data flowing in one direction. For the grid to be smarter, it needs to both send and receive data quickly and securely. Given the amount of data and information that will result from new Smart Grid initiatives, new IT applications, new data management tools and new storage and security systems will be vital to the success of Smart Grid communications and network systems. These subjects will be explored in this workshop.

SGPS 470 – Smart Grid ROI – Weighing the Costs and Benefits to Stakeholders

- NEW -
- 0.5 days
- 0.3 CEUs/
- 3 PDHs

The promise of a smarter grid comes at a cost. Who benefits and who pays for it will be the focus of this discussion.
Siemens System OPERATOR Training (SSOT) Courses

These online Siemens System OPERATOR Training (SSOT) courses are specifically designed to aid power system operators and operations staff in preparing for the NERC certification exams. Delivered via the Internet or downloaded onto your computer, the SSOT course series provides affordable and timely access to training regardless of your shift or location.

SSOT courses are part of the PracTest™ 2006 training series. System operators will receive test-taking preparation for their initial NERC credential through hands-on practice and practice exams. Gain familiarity with the NERC standards and their application on North American systems, receive tutorial feedback, and when you are ready, take practice exams that consist of realistic questions.

<table>
<thead>
<tr>
<th>SSOT Course</th>
<th>Online/Computer-based</th>
<th>Description</th>
<th>Credits/Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSOT 310</td>
<td>Online</td>
<td>Reliability Operator Standards and Operating Review</td>
<td>NERC-approved (13.5 continuing education hours, 8 standards hours, 4 EOP hours) 13.5 PDHs</td>
</tr>
<tr>
<td>SSOT 320</td>
<td>Online</td>
<td>Balancing, Interchange and Transmission Operator Standards and Operating Review</td>
<td>NERC-approved (16.5 continuing education hours, 9.5 standards hours, 5 EOP hours) 16.5 PDHs</td>
</tr>
<tr>
<td>SSOT 330</td>
<td>Online</td>
<td>Balancing and Interchange Operator Certification Standards and Operating Review</td>
<td>NERC-approved (13.5 continuing education hours, 8 standards hours, 4 EOP hours) 13.5 PDHs</td>
</tr>
</tbody>
</table>

Other NERC-approved courses:

- **PDEC 500 – Power Distribution Engineering**
  - NERC-approved (18 continuing education hours, 6 standards hours, 1.5 simulation hours) 18 PDHs
- **PDEC 563 – Understanding System Losses for Utility Management**
  - NERC-approved (18 continuing education hours, 2.5 standards hours, 0.5 simulation hours) 18 PDHs
- **PSEC 505 – Introduction to Power Flow Analysis with Applications**
  - NERC-approved (18 continuing education hours, 2.5 standards hours, 0.5 simulation hours) 27 PDHs
- **PSEC 510 – Analytical Methods for Voltage Control and Reactive Power Planning**
  - NERC-approved (18 continuing education hours, 2.5 standards hours, 0.5 simulation hours) 27 PDHs

<table>
<thead>
<tr>
<th>PSEC Course</th>
<th>Description</th>
<th>Credits/Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSEC 535</td>
<td>– Power System Studies for Wind Integration</td>
<td>NERC-approved (27 continuing education hours, 23 standards hours, 4 simulation hours) 27 PDHs</td>
</tr>
<tr>
<td>PSEC 600</td>
<td>– Introduction to Power System Dynamics</td>
<td>NERC-approved (27 continuing education hours, 5 simulation hours) 27 PDHs</td>
</tr>
<tr>
<td>PSEC 635</td>
<td>– Power System Scheduling and Market Operations</td>
<td>NERC-approved (18 continuing education hours, 8 standards hours, 17.5 simulation hours) 18 PDHs</td>
</tr>
<tr>
<td>PSSC 500</td>
<td>– PSS®E - Power Flow and Steady State Analysis</td>
<td>NERC-approved (27 continuing education hours, 11.5 standards hours, 7.5 simulation hours) 27 PDHs</td>
</tr>
<tr>
<td>PSSC 700</td>
<td>– PSS®MUST - Introduction to Using System Transmission Data for Decision Making</td>
<td>NERC-approved (18 continuing education hours, 6 simulation hours) 18 PDHs</td>
</tr>
</tbody>
</table>

NERC-approved courses denoted with a CC are included in one or more Certificate Concentrations (CC).
Siemens PROTECTIVE Relay Training (SPRT) Courses

Siemens PROTECTIVE Relay Training (SPRT) courses are intended for protective relay engineers, designers and technicians from engineering firms, electric utilities and the industrial sector wishing to expand on a working knowledge of protection systems and equipment.

**SPRT PRA 1**
Protection Relay Application Training
- **2 days**
  - **1.2 CEUs**

This course focuses on the basic knowledge of the planning, commissioning and maintenance of system protection equipment. Upon completion of this course, the students shall be able to:

- Understand the main protection principles of overcurrent
- Explain differential and distance protection
- Select the appropriate protection function or group of functions for each application and understand how to construct to the most economical protection systems.

**SPRT DIGSI 1**
DIGSI Overview Training
- **2 days**
  - **1.2 CEUs**

This course focuses on the basic knowledge of the planning, commissioning and maintenance and operation of SIPROTEC protection devices. Upon completion of this course, the students shall be able to:

- Configure a relay
- Use the input/output matrix
- Program the default and control display
- Program additional logic in CFC
- Analyze fault records with SIGRA
- Use all commissioning support tools in DIGSI.

**SPRT DIGSI 2**
Advanced DIGSI CFC Training (*1)
- **1 day**
  - **0.6 CEUs**

This course focuses on gaining working knowledge of DIGSI professional to design CFC logic into SIPROTEC relays using DIGSI Professional Device Manager, Device Editor Configuration Matrix and CFC Editor. Upon completion of this course, the student shall be able to:

- Define a basic CFC chart and use the DIGSI Device Editor Configuration Matrix to assign items sources and destinations to/from the CFC charts
- Use the DIGSI CFC Editor to create a CFC chart, insert logical functions and draw the technological sequence of logic by assigning CFC inputs and outputs
- Compile the CFC chart, save the Device File and download the Device File to the relay.

**SPRT DIGSI 2.2**
IEC61850 Training for Protection Engineers
- **1 day**
  - **0.6 CEUs**

Participants are introduced to the tools needed to configure a GOOSE message and will learn which steps are needed and how to confirm a proper configuration. Upon completion of this course, the students shall be able to:

- Know the purpose of IEC61850 components
- Understand the meaning and content of ICD and SCD files
- Work with and configure IEC61850 System Configurator
- Use analyzing tools to monitor the Ethernet telegrams
- Configure protection schemes with GOOSE messages.

**SPRT DIGSI 3**
Advanced IEC61850 DIGSI Training (*1)
- **1 day**
  - **0.6 CEUs**

This course provides a brief overview of IEC61850, followed by programming examples using DIGSI Manager, Device Editor Configuration Matrix, CFC Editor and System Configurator. Upon completion of this class, the student shall be able to use DIGSI Manager to:

- Create a DIGSI project and insert IEC61850 devices
- Convert an IEC61850 station into the DIGSI project and define communications of the IEC61850 station
- Use DIGSI Device Editor Configuration Matrix and CFC Editor to design a basic IEC61850 automation scheme
- Use DIGSI System Configurator to define the IEC61850 communication network and link information to the communicator.

*1 These courses have prerequisite requirements. Please check with coordinator at registration.

Siemens Power Academy
Email: pti-edpro.ptd@siemens.com
Phone: +1 (518) 395-5005
Web: www.usa.siemens.com/energy/pti-education
Course structure
(NERC, CEUs and PDHs)

Course structure

Given the fragmentation of information that interrupts our daily lives – emails, instant messages and the like – getting away to focus on just learning helps protect your training investment by helping you become fully engaged in the learning process. Highly technical course content is more easily grasped, retained and successfully applied when you engage directly with the instructors and fellow students in a classroom setting. These are a few reasons why Siemens Power Academy still believes in traditional instructor-led training (ILT).

To supplement our traditional experience, we also provide an online portal through our Learning Management System (LMS) and through our online social connections. These allow students to review supplemental materials, exchange information and ideas with fellow classmates from around the world, and continue the learning process before, during and after the formal learning experience.

Class times

Unless otherwise specified, instructional hours are as follows: full days 9 a.m. to noon, and 1 p.m. to 4 p.m., with half days 9 a.m. to noon on the last day of the course. Workshops operate in morning and afternoon sessions. Check the schedule for details.

Continuing education credits

All courses offered through Siemens Power Academy TD – NA meet the requirements for Continuing Education Units (CEUs) and Professional Development Hours (PDHs). In addition to our NERC-certified courses, we are also an authorized New York State Department of Education Continuing Education Provider.

The CEU is the nationally recognized unit for recording participation in professional development and non-credit educational programs. Students completing these courses are eligible to receive CEUs based on the instructional hours of the course: one CEU is awarded for 10 classroom hours of instruction.

Licensed engineers, on a voluntary or mandated basis, attend continuing professional education for licensure renewal to ensure competency. Continuing professional education for licensed engineers is measured in PDHs: one PDH is awarded for one classroom hour of instruction. Below is a conversion chart for your reference:

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The student is responsible for maintaining records of courses taken in support of licensure.

Students may also be eligible to apply for transfer credit at participating colleges and universities. Currently, Manhattan College, Worcester Polytechnic Institute (WPI) and Texas A&M have reviewed our courses for credit consideration in their programs. Each university will have guidelines on what they will accept for transfer credit.
Your training...your facility

By bringing Siemens Power Academy education and training programs to your facility, you benefit from schedule flexibility, minimize participant travel costs and allow your team exclusive access to the instructor in a confidential setting. Our experienced network consultants can also come on-site for problem solving and coaching.

We can customize all course content to your participants’ specific needs and abilities. If you would like more information, please contact the Siemens Power Academy TD – NA education office at (518) 395-5005 or email: pti-edpro.ptd@siemens.com.

Learn from the finest

Our network consultants are our instructional team. With more than 40 teaching consultants on staff and several independent specialists who support our programs, our faculty has more than 400 years of collective power systems expertise! In the classroom, they make extensive use of real-world examples and experience while sharing the latest research in power systems and power systems analysis. Many have been recognized for their contributions with awards from national and international organizations.

Leadership development programs for succession planning

Through our extended professional development programs, non-technical professionals and engineers new to power systems can gain the necessary background needed to become better managers, better decision makers and more effective engineers. These programs have been evaluated for credit and can be applied to master’s level programs at participating universities.

Many graduates of our extended programs have gone on to become significant contributors in their organization’s planning, design and operation departments. Each program’s objectives include enhancement of the fundamentals of electrical engineering theory for each topic, as well as the development of practical problem-solving abilities. Our programs include:

The Power Technology extended program gives participants a deeper appreciation of electric power system technology by providing instruction in a variety of topics. Students gain a working knowledge of generation, transmission and distribution, and the interrelationships that bind them into a coordinated power system.

The Distribution Systems Engineering extended program focuses on electric power distribution systems and equipment. Participants gain practical knowledge of distribution equipment applications and impacts on reliability, planning, design, operations and economic and environmental issues.

We would be happy to customize these programs to your specific needs. For more information, please contact the Siemens Power Academy education office at (518) 395-5005 or email pti-edpro.ptd@siemens.com.

Many graduates of our extended programs have gone on to become significant contributors in their organizations.
# 2012 Course Schedule

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March 2012

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# 2012 Course Schedule

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Siemens Power Technologies International (Siemens PTI) is the provider of network consulting, software solutions and Transmission and Distribution training within Siemens Energy. For decades, Siemens PTI has provided a wide range of power system software and related consulting to the energy industry throughout the world. With 40 years of experience in professional power system analysis and planning, Siemens PTI offers services in power system dynamics, power quality and protection for all voltage levels and all kinds of networks.

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Siemens PTI has a legacy of world renowned engineering experience and innovative software and technology to assist you with today’s complex issues. Our comprehensive services include technical, economic and regulatory expertise, as well as network analysis and solution development, expert testimony and industry training, and system solution integration. Our offices are conveniently located throughout the world providing you with regional expertise. Siemens Energy provides services and solutions at all voltage levels including industrial networks, public grids and large-scale systems. For more information, please visit our Siemens PTI website and use our contact form.

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**Siemens PTI PSS® Product Suite**

With the Power System Simulator (PSS®) Product Suite, Siemens PTI provides a range of analysis tools, including our premier product PSS®E for electrical transmission planning, which has been significantly upgraded with modern graphics, e.g. integration with modeling tools. For more information, please visit our website and use our contact form.

www.usa.siemens.com/energy/pti-software

**Main software products:**

- **PSS®E** – Transmission system analysis and planning
- **PSS®MUST** – Managing and utilizing system transmission
- **PSS®ODMS** – Operational data management
- **MOD®** – Model data management and delivery
- **PSS®SINCAL** – Utility and industrial system analysis

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Terms and conditions

1. Registration
Applications to attend courses must be submitted in writing using the electronic registration form at http://siemens.coursewebs.com. Registrants agree to be bound by the Siemens Energy, Inc. and Siemens Power Technologies International (Siemens PTI) general terms and conditions for training.

2. Acknowledgement of registration
We will send you confirmation of the requested training course, course dates and fee, or, if there are no vacancies for the dates you have requested, we will send an acknowledgement in the form of a provisional notification offering alternative dates. You must acknowledge your intent to participate in the alternative course/date provided to receive confirmation of participation.

3. Services
Our services include:
- Conducting of training courses
- Providing accompanying documentation to the training
- Providing requisite materials and resources
- Issuing a certificate of attendance (certificates of attendance are only issued if participants attend at least 80 percent of the training course sessions).

Training course descriptions are accurate at the time they are published. We reserve the right to change, adapt or develop course contents to reflect current state-of-the-art course contents, and may as a result, deviate from those specified in course descriptions.

4. Prices and terms of payment
Training course prices are specified in the course schedules and on our registration website. Prices are in U.S. dollars and do not include the cost of accommodations and travel. The scope of services and price of customized training courses are specified in the particular offer.

The statutory rate of value-added tax shall be added to all prices quoted. If an acceptable tax exemption certificate is submitted, taxes will not be due based on the state or country.

Upon registration for the training course, participants will be issued an invoice which shall be due for settlement within 30 days upon receipt of the invoice or due prior to the course date, whichever is earlier with no deduction. Payment may be made by wire transfer, check or credit card (only Visa, MasterCard and American Express). Siemens employees shall be invoiced by way of internal procedures.

5. Cancellations by registered participants
Registered participants shall be entitled to nominate alternative participants prior to the commencement of the training course. Up to 21 days before the training course begins, registrants may cancel their course registration at no charge, or they may transfer to another section that is scheduled for a later date. At 14 days prior to the course, 50 percent of the price of the training will be refunded for cancellations. No refunds will be issued for any cancellations received less than 14 days prior to the start of the course. The cancellation date is deemed to be the date that Siemens PTI receives a written cancellation.

6. Copyright
Written and electronic course materials may not be reproduced for any purpose without the prior written consent of Siemens PTI and may only otherwise be used for purposes explicitly authorized by Siemens PTI. Siemens PTI PSS® software used or provided for the purpose of conducting the training course may not be removed, nor copied (in whole or part), nor used in any other unauthorized way. Neither video recording nor sound recording is permitted.
7. Participant prerequisites
Siemens PTI may require that course participants either have a valid software license or be employees of an organization possessing a valid software license for courses dealing with the use of training software. Additionally, Siemens PTI may in its sole discretion exclude participants from any course.

8. Safety regulations
Course participants shall comply with all safety and accident-prevention regulations in force on Siemens’ premises. Participants also agree to be bound by all other applicable rules, particularly those concerning access.

9. Liability
All technical information provided in connection with the courses and/or in the training documentation is correct to the best of Siemens PTI’s knowledge; however, liability is disclaimed as to the accuracy (e.g. exclusion of printing errors) of the information provided in the course and/or in the training documents. Siemens PTI and registered participant (the “Client”) agree that the services provided for herein will be performed in accordance with recognized professional consulting/education standards for the same or similar services. Both parties acknowledge that utilization of the educational seminar material depends upon many factors not within the control of Siemens PTI. As such, and notwithstanding any other provision to the contrary, Siemens total aggregate liability to Client for damages suffered by Client shall be limited to 100 percent of the amount of the fees for services received by Siemens PTI as relates to the affected participant(s). In no event shall Siemens PTI, its parent corporation, or its or any affiliates, agents, employees, or others providing materials or performing services be liable for any other direct, indirect, incidental, consequential or special loss or damage, whether attributable to breach of contract, warranty, express or implied, tort, including negligence, strict liability, or otherwise. Except as otherwise herein provided, Client releases Siemens PTI, its parent corporation and any affiliates, agents, employees, or others providing materials or performing services from and against any and all liability, as well as costs of defense, settlement and reasonable attorney’s fees, irrespective of fault or negligence.

10. Reservation of right of modification
Siemens PTI reserves the right to change the location of training courses, to postpone or cancel courses or to assign a different speaker/instructor. If the location or time of the course is changed, the registered participant is entitled to cancel their registration in writing within three working days of receipt of such notice of change and receive a full refund. All other claims for substitution, damages or losses are excluded.

11. Export controls
All training and services provided by Siemens PTI are subject to applicable United States and international export control laws and regulations. Siemens PTI reserves the right to cancel any registration, training or other services at any time in order to comply with such export control laws or regulations.

12. Applicable law, legal venue
Services shall be performed pursuant to the substantive law of the State of New York to the exclusion of the United Nations Convention on the International Sale of Goods.

13. Written form
The parties agree that all agreements for services shall be made in writing and likewise may only be amended or waived in writing.
Registration, payment and contact information

Find the most current information on course availability and schedules on our registration website at: http://siemens.coursewebs.com.

Register online
Register online at Siemens.coursewebs.com to reserve your seat today! Select your course, add it to the cart and proceed to the checkout screen. Then, either log-in to your account or create one, select your payment option (credit card or invoice) and you will receive an email containing your registration receipt within minutes.

Once your tuition is paid, check out the course content posted on our Learning Management System (LMS), view course schedules, read instructor bios, preview course content and materials and test your knowledge by taking pre-course quizzes.

Confirmation and logistics
Course logistics information (hotels, directions to the facility, transportation and parking) will be available through LMS (or just give us a call).

Tuition
Tuition includes a bound set of course notes and/or reference text. Course participants receive complimentary daily continental breakfast and lunch, and for many of our courses we host an icebreaker networking reception on the second evening of class. Lodging, transportation and meals beyond those provided during the course are not included.

Payment
Payment in U.S. dollars is due at registration. We accept Visa, MasterCard and American Express. If you are paying via company purchase order (PO) we’ll need your PO before the start of class. Only paid registrations are guaranteed. Please refer to terms and conditions regarding withdrawing from class and applicable course cancellation fees. Refundable travel arrangements are strongly advised unless course is confirmed to take place.

International students
Siemens Power Academy will assist participants and their families by providing contact information for living accommodations, hotels and other interests in the local area.

Students who require invitation letters to the training event for their visa applications are encouraged to submit this request, along with their registration and tuition payment, at least 60 days prior to the start of the course.

Please ensure that your visa is valid for more than six months past the training date.

Please see the Terms and Conditions section on payment and course cancellation policy.

Promotional offers

Early-bird registration 1, 2
Receive a 10 percent discount if you register and pay 60 days prior to the start of a course (use coupon code ER112 in the coupon field of the registration form).

IEEE members 1, 2
Receive a 10 percent discount if you are a current IEEE member. Contact us for details.

Group rates 1, 2
Receive a 15 percent discount on three students from the same company registering for the same class on the same date. Contact us for details.

Siemens Power Academy
Email: pti-edpro.ptd@siemens.com
Phone: +1 (518) 395-5005
Web: www.usa.siemens.com/energy/pti-education