A practical, interactive course for engineers, technicians, designers, contractors, line workers, electricians, inspectors, supervisors, and others...

**Underground Electrical Distribution Systems**

September 9–11, 2014
Madison, Wisconsin

Master the basics of:

- System components
- Planning and design of underground systems
- Operation and maintenance of underground systems
Practice-Oriented Course
This practical course provides you with an excellent opportunity to learn about underground electrical distribution systems from a professional engineer who has spent his entire working career as an engineer, manager, and consultant in the utility industry.

During three days of comprehensive and interactive course work, you will learn about:
- What constitutes an underground electrical distribution system
- Typical policy and service guidelines for service to electric customers
- Underground system planning considerations
- Underground system components and equipment
- Safety, operation, and maintenance of underground systems
- Cable design, application, and termination
- Underground system fusing and protection

Who Should Attend
You will benefit from this course if you work in the areas of planning, design, construction, operation, maintenance, or safety of medium-voltage underground electrical distribution systems in a utility or institutional setting. This includes:
- Engineers
- Technicians
- Designers
- Contractors
- Consultants
- Line workers
- Electricians
- Inspectors
- Safety personnel
- Supervisors

Real-Life Illustrations and Examples
Your learning experience will include a combination of short lectures, Q&A, case studies, and group exercises. The course provides numerous opportunities for interaction, including group discussions of specific situations from the participants’ experience.

Learning Objectives
Upon completion of this course, you will be able to:
- Understand the types of components that comprise a medium-voltage electrical underground distribution system
- Know what general planning, code/standard compliance, and other considerations to apply in the development of an electrical underground distribution system
- Know the importance of having effective and consistent policy and service guidelines for electric customers
- Determine the role of risk management and applicable codes like the NESC
- Better understand the use and operation of various components in underground electrical distribution systems
- Determine what considerations go into the design and layout of underground electrical distribution systems
- Know what factors are important to the proper operation and maintenance of underground electrical distribution systems
- Better understand the principles and practices of fusing and protection of underground systems

Earn Continuing Education Credit
By participating in this course, you will earn 20 Professional Development Hours (PDH) or 2.0 Continuing Education Units (CEU).

Special Features of this Course
- Specific, understandable presentations to increase your fundamental knowledge of underground electrical distribution systems
- Instruction by a knowledgeable and experienced professional
- Interaction with others who work in this area
- Participation in design and problem-solving activities
- Practical information you can put to work immediately
- Valuable reference materials

Expert Instruction
Mark Swan, PE, has spent 39 years in the electrical power industry. He has been responsible for the design, installation, operation, and maintenance of electrical substations, transmission lines, distribution lines, and control centers. His experience also includes leadership positions in the operation and maintenance of water and waste water systems, as well as the distribution of natural gas. He has been involved in the investigation of electrical shock accidents to members of the public and in accidents in the work place.

Swan holds a BSEE and an MSEE (Power Option) from the University of Colorado. He is licensed in the state of Colorado and is a member of IEEE, NSPE, and the Tau Beta Pi honor society.
Course Outline

Course Introduction
- University of Wisconsin and course instructor
- Course objectives, schedule, notebook, and format
- Course participants’ sharing of objectives, questions, and problems

Introduction to Underground Distribution
- Overview of underground distribution systems and components
- Planning and policy considerations
- Terms and conditions of customer interconnection and service
- Easements and ownership of facilities
- Joint-use arrangements with other utilities
- Working arrangements with developers and contractors
- Industry codes/standards
- Cost recovery methods
- Competitive issues for distribution utilities

Underground Cable
- Cable theory and construction
- Electrical and mechanical properties
- Conductor types
- Insulation types
- Special features
- Selection, ratings, and loading practices
- Technical specifications

Cable Accessories
- Voltage stress relief
- Cable preparation
- Terminators
- Splices
- Selection and ratings
- Technical specifications
- Installation practices

Underground Structures
- Direct burial trenches
- Conduits and ducts
- Vaults and manholes
- Riser poles
- Technical specifications
- Installation practices

Pad-Mounted and Submersible Equipment
- Transformers, switches, fuses, and lightning arresters
- Selection ratings
- Technical specifications
- Installation practices

Cable Installation in Underground Structures
- Cable pulling limitations
- Cable pulling calculations
- Pulling equipment and methods

Course Schedule

Registration and course will be held at
The Pyle Center
702 Langdon Street
Madison, WI

Day 1
7:30 a.m. to 8:00 a.m.  Registration
8:00 a.m. to 5:00 p.m.  Class

Day 2
8:00 a.m. to 5:00 p.m.  Class

Day 3
8:00 a.m. to 3:00 p.m.  Class

Refreshments prior to the start of the course, midmorning and midafternoon refreshment breaks, and lunch will be provided all three days.

Past Participants Say

“PRACTICAL CASE STUDIES WERE VERY HELPFUL TO UNDERSTAND THE PRINCIPLES. VERY USEFUL COURSE. I WILL RECOMMEND IT TO OTHERS.”
Robert Mpiana, Distribution Designer, MCW Consultants Professional Engineers, Richmond, British Columbia

“EVERYTHING WAS GREAT. LOTS OF GOOD REAL-LIFE PICTURES AND DESCRIPTIONS.”
Ross Barrette, Assoc. Electrical Engineer, Wisconsin Public Service, Green Bay, Wisconsin

“This course gave me a clear understanding of underground systems. Group assignment was great.”
Henry Wilson-Sowah, Engineer, Central Hudson Gas & Electric, Poughkeepsie, New York

“This was the best short course I have ever taken. This is exactly what I was looking for. Very well-written syllabus.”
Eric Deering, Electrical Designer, Faith Technologies, Manitowoc, Wisconsin

ENROLL ONLINE TODAY! Or visit our website.
Course Information

- Please enroll me in **Underground Electrical Distribution Systems**
  - **Course #P458**  September 9–11, 2014 in Madison, WI  Fee: $1395
- Team Discount: $100 off per person when two or more people from the same organization enroll.
- I cannot attend at this time. Please send me brochures on future courses.

Upcoming Courses

- **Understanding Power Cable Characteristics and Applications**  October 27–31, 2014  Madison, Wisconsin  
  - **Course #P603**

- **Principles of Substation Design and Construction**  October 29–31, 2014  Madison, Wisconsin  
  - **Course #P925**

- **National Electrical Code**  November 11–13, 2014  Madison, Wisconsin  
  - **Course #P439**

General Information

**Fee Covers** Course materials, break refreshments, lunches, certificate, continuing education credits (CEU/PDH), and rosters.

**Please Bring** Your copy of the National Electrical Safety Code (IEEE C2-2012) and a calculator to the course to enhance your studies. In addition, bringing copies of your company’s distribution standards or samples of work will increase your learning.

**Cancellation** If you cannot attend please notify us at least seven days prior to the course start, and we will refund your fee. Cancellations received after that date and no-shows are subject to a $150 administrative fee per course. You may enroll a substitute at any time before the course starts.

**Accommodations** We have reserved a block of guest rooms (rates starting at $89, including parking and Madison Taxi’s silver cab from the airport) at Campus Inn, 601 Langdon Street, Madison, WI. Reserve a room online at [epd.engr.wisc.edu/lodgingP458](http://epd.engr.wisc.edu/lodgingP458) or call 800-589-6285 or 608-257-4391 and indicate that you will be attending this course under group code 149729. Room requests after August 18 will be subject to availability. Other fees and restrictions may apply.