

Professional Development

UC Synergetic is a leading education provider for electrical utility technical staff, specifically targeting the power delivery sector. Tenured instructors within the industry combined with a strong course curriculum create a learning experience that attendees consistently rate as outstanding. Graduate engineers report these classes are excellent prep for the Professional Engineer Examination.

Many of the courses are 2.5 days in duration which provides ample time to introduce and thoroughly explore topics. Real world example problems bridge the gap from academic to practical applications. The cross section of students generates discussions that reveal a variety of valid solutions for common issues.

Some courses are abbreviated to a 1.5 day format. These offer a good introductory base to the many of the same topics present in the longer course. Less time is dedicated to solution based discussion. In most cases, these are offered back to back with a complementing course of a related topic to create a full three-day learning event.

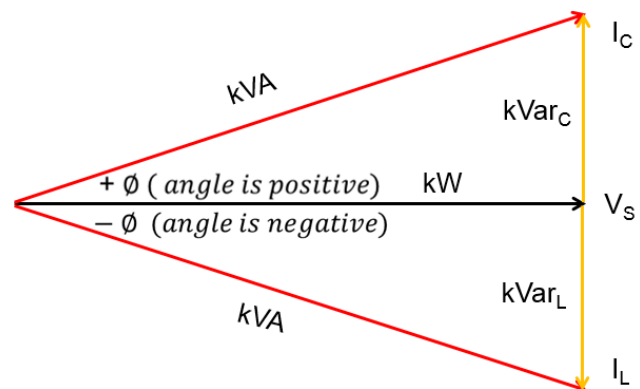


Distribution Feeder Design with NESC Overview

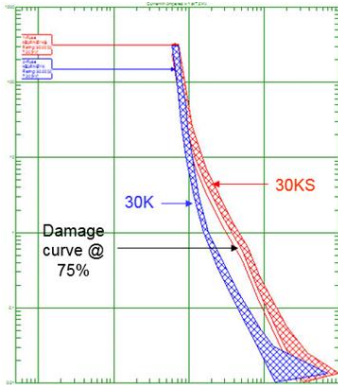
is an introduction to the feeder design process for both overhead and underground distribution. Most states adopt the National Electric Safety Code (NESC) as their minimum requirement for clearances and strength. The curriculum provides interpretation of NESC when necessary. Real world examples provide attendees the opportunity

for discussion of possible solutions of design options.

The **Electric Distribution Fundamentals** course covers the “corner stone” topics within Electrical Distribution. The Power Triangle, System Losses, Voltage Drop, Over Voltage and Over Current Protection provides attendees the essential building blocks for more indepth topics in subsequent courses. Attendees are introduced to all major protective and power quality equipment including arresters, fuses, reclosers, power capacitor and voltage regulators.



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System reliability is the main focus of the **Distribution Overcurrent Protection** course. Attendees will examine the drivers to reducing outage rates and improving reliability measures (SAIDI, SAIFI, etc.). Beginning with fault current calculations, the material progresses to the introduction of line sectionalizing equipment and their applications. All combinations of device to device coordination (fuse/fuse, fuse/recloser, recloser/breaker, etc.) are explored to provide a thorough understanding of techniques that enable these devices to reduce area effected by

faults to the smallest possible area.

Distribution Volt/VAr Management

focuses on two areas: power quality (voltage control) and economics (system loss reduction through improved power factor). Attendees will learn concepts such as load factor, loss factor and voltage drop calculation. The course not only introduces Power Capacitors and Step Voltage Regulators but goes beyond to the application and coordination of these devices. Students will understand the effects reverse power (looped feeders) and dispersed generation have on this equipment. The course also includes background and application of technologies being applied in modern integrated volt/var control (IVVC) schemes for demand and energy management.



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Distribution grid planning is becoming more complex as Distributed Generation and Automated Systems become part of the landscape. **Distribution Grid Planning & Optimization** begins with a discussion of traditional planning on radial systems and bulk generation. Smart Grid technologies and Distributed Energy Resources are introduced as well as integration issues. This is an accelerated course designed to address compatibility between devices and systems, essential to avoiding sunken cost of conflicting investments.

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Short Topics

UC Synergetic engineers have conducted numerous studies and authored countless papers. Here are a few that have been converted to 1 – 2 hour programs. On occasion or special request, these topics may be presented in conjunction with courses.

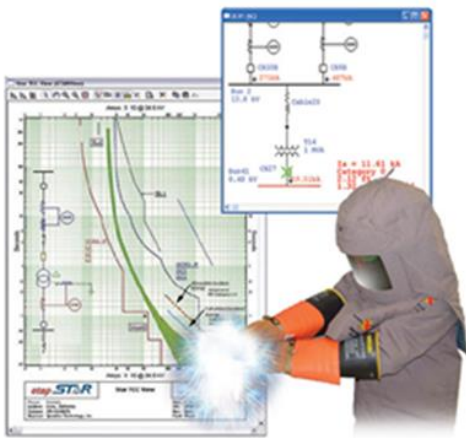
High Penetration of Distributed Generation

The demand for solar and wind power generation is constantly increasing. Electric utilities must consider the best way to accept these sources without threatening power quality and operation of modern distribution systems. To address these challenges, stakeholders must consider pre-emptive measures – both engineering and administrative– to make the addition of distributed energy resources as efficient as possible. This session explores issues



and solutions which acknowledge future operation and maintenance worries, while optimizing the contributions of traditional and renewable generation. Case studies from existing distribution-scale facilities will be presented to stir questions and help stimulate the attendees' creativity; allowing them to see the benefits along with pitfalls.

It's nearly impossible to create a procedure for resolving **Stray Voltage Issues**. This lecture provides a better understanding of how and why this phenomena occurs. Engineering formulas directly relating stray voltage are reviewed. Those are portions of the distribution system most likely to experience this problem are listed. Mitigation techniques are outlined and prioritized.



Every organization responsible for the safety of employees working on electrical equipment should be concerned with the exposure to the duration of intensity of arc flash. The **Arc Flash Hazard Protection** lecture is intended to lay the groundwork for setting up effective safety practices, or to help identify any gaps that might exist in programs already in place. The course begins with some background and history then proceeds through Standards and Regulations; Identification of Hazards Present; Analysis of Arc Flash Energy; and Alternative

Methods for Mitigation – including their pro's and con's.

Professional Development

Certification

Attendees will receive a certificate accrediting them with Professional Development Hours in accordance with NCEES standard recommendations. UC Synergetic is a Registered Continuing Education Provider with the Florida Board of Professional Engineers.

UC Synergetic Technical Training Course Discount Schedule

- UCS Client - 15% (Attendee must be employed by an organization that is currently a client of UC Synergetic. Must provide copy of business card or company ID)
- Federal/State Government Agency Discount - 15% (Must provide copy of a valid Federal/State Government Agency ID or business card. Agency must be directly related to the electrical power industry, such as FERC or a state public utility regulatory commission.)
- Quantity Discount - 25% (Any organization sending 4 or more people to a single course.)
- University employee/faculty discount - 50% off (Employee/faculty must complete questionnaire and provide documentation to qualify)

Attendees seeking discount must provide qualifying documentation to Jerry Josken (email: jjosken@ucseng.com or call 919-348-3432).

Visit the UC Synergetic website training page for a selection of open enrollment courses and links to online registration.

<http://www.ucseng.com/training.html>

In-House Training

UC Synergetic can custom fit training material to your organization's needs. Inquiries are welcome!!!! Contact our Technical Training Coordinator, Jerry Josken, with any questions. (email: jjosken@ucseng.com, phone: 919-348-3432).