



## Distribution Grid Planning & Optimization

July 17 - 19, 2018

Denver, CO

### *What is this course about?*

Distribution Grid Planning is becoming more complex as Distributed Generation and Automated Systems become part of the landscape. This course begins with a discussion of tradition planning on radial systems with bulk generation. Smart Grid systems 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.

### *Who should attend?*

Those holding technical leadership positions within a distribution electric utility, including Engineers/Technicians, System Planners, and Electric System Superintendent/Directors with responsibility for system planning and specifying equipment/systems.

### *Continuing Education Credits*

Upon completion, attendees will receive a certificate for 18 Professional Development Hours (PDH). UC Synergetic is a licensed provider of continuing education by the Florida Board of Professional Engineers. UC Synergetic Courses have never been refused as professional development hours by any State PE Board.

### *Instructor Bios:*

**David Farmer PE**, is the Director of System Planning & Grid Technologies for UC Synergetic. He holds a Bachelor's Degree in Electrical Engineering from West Virginia University Institute of Technology and is a registered professional engineer in multiple states. Since 1983, Mr. Farmer has worked with electric utilities in power delivery planning, load forecasting, reliability analysis, engineering and operations, construction and design, training, and project management. David has worked for both investor owned utilities and electric cooperatives.

**Chris Sticht** is a Senior Consultant for UC Synergetic. Mr. Sticht is a specialist in utility system planning, load analysis, planning software, underground, solar and Smart Grid. Chris has extensive background in planning, design, operations and protection. His background includes work on transmission systems, distribution systems, substations, and commercial building electrical systems. He has managed teams of engineers, designers and electricians. His experience includes consulting, contracting, work at two power flow software companies, and at several major utilities. He holds a MSEE from the University of Washington and a BSEE from Georgia Tech.

**Jerry Josken** is a Senior Consultant for UC Synergetic. Jerry holds a BS in Electrical Engineering Technology from the Milwaukee School of Engineering and a MBA from North Central College. During his 30+ year career with Eaton's Cooper Power Systems Jerry served in a variety of engineering positions. Past leadership positions include Chair of IEEE Rural Electric Power Conference (2012) and GLEMS Distribution Equipment /Controls (2013-2014). Presently, Jerry coordinates UCS Training Programs.



### ***Course Location***

Renaissance Boulder Flatiron Hotel  
500 Flatiron Boulevard  
Broomfield, Colorado 80021 USA

<https://www.marriott.com/hotels/hotel-rooms/denir-renaissance-boulder-flatiron-hotel/>

### ***Course Registration***

The course tuition is \$1495 per person. Tuition will include course materials, refreshments, and lunches on Tuesday and Wednesday. [Click here to register on line.](#)

Hotel accommodations, transportation and other incidentals will be the student's responsibility.

Cancellations received after July 9, 2018 will receive a credit that can be used for tuition on a future UC Synergetic Course. The credit is good for one year and is transferable within the same company. In the unlikely case of course cancellation, UC Synergetic liability is limited to refund of the course registration fee only.

For additional information about this course, other UCS course offerings, or on-site pricing, please contact Jerry Josken at (919) 348-3432 or via e-mail at: [jjosken@ucseng.com](mailto:jjosken@ucseng.com).

### ***Professional Development Hours***

Attendees to UC Synergetic courses receive a certificate of completion at the conclusion of each course. Licensed Professional Engineers seeking continuing education credits may use these courses to satisfy their professional development requirements. UCS is a registered continuing education provider with Florida and North Carolina Board of Professional Engineers. UCS courses have never been rejected as valid professional development hours by any state PE boards.

### ***Tuition Discounts***

Current UC Synergetic clients are eligible for tuition discounts. Any organization registering 4 or more attendees to any single course will receive a 25% discount. Discount codes are also available for engineering students and faculty as well as federal and state employees. Contact Jerry Josken (email: <mailto:jjosken@ucseng.com> cell: 919-348-3432) for more information.

# Grid Planning and Optimization

## Course Outline

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### System Loading

- Load Diversity
  - Demand Response Systems.
- Load Forecasting and Weather Impacts
- Equipment Loading

### System Losses vs. Load

- Calculating Losses
  - Power Factor
- Line Voltage Drop
- Volt/VAr Management & Options

### System Reliability

- Effects of Mid Line Sectionalizing
- Effects of Tie to Adjacent Circuits
  - Effects of Reverse Power Flow

### Smart Grid Characteristics

- Definition per Dept of Energy

### Smart Grid Components

- Intelligent Electronic Devices (IEDs)

### Communication for IEDs

- Mediums
- Protocols

### Automated Systems

- Centralized Control
  - Self Healing Networks
  - Integrated Volt/VAr Control
- Peer to Peer Systems

### Distributed Energy Resources

- Definitions
- Types of Generation
  - Inertia vs. Non-inertia Based

### Distributed Generation Integration

#### Issues

- Islanding
- Load Profile vs. Photovoltaic (PV) Output
- High Penetration of PV on Distribution Circuits
- Non-technical Issues

### Justifying Capital Projects

- Engineering Economics