



Southeastern Meter School & Conference

The Hotel at Auburn University
and Dixon Conference Center

Auburn, Alabama

March 20th - 23rd, 2017

Sponsored by the
Southeastern Meter Technical Association

In Cooperation with



Southeastern Meter School & Conference Class Schedule

Monday, March 20th

Time	Module 100	Module 200	Module 300	Module 400	Module 500
10:00 - 1:00	Registration				
1:00 - 1:30	General Session				
1:30 - 2:30	“Technology Architecture Considerations for Smart Grid & Beyond” Kathy Shaffer, <i>OMNETRIC Group</i>				
2:30 - 3:00	Networking and Refreshment Break				
3:00 - 4:00	Meter Safety Combined Class				
4:00 - 5:30	Exhibit Hall / Hospitality				

Tuesday, March 21st

Time	Module 100	Module 200	Module 300	Module 400	Module 500
8:30 - 10:00	Math & Electrical Fundamentals	Power Theory	Grounding & Bonding Meter Sockets	Cyber-Terrorism Defense - Protecting Our Nations Critical Infrastructure	Meter Programming Aclara
10:00 - 10:30	Networking and Refreshment Break in Exhibit Hall				
10:30 - 12:00	Single Phase Metering Theory	Principles & Applications of Polyphase Metering	Fundamentals of Single & PolyPhase Field Meter Testing	US Army Central Metering Program	Meter Programming Aclara Continued
				Next Generation of Metering Technologies	
12:00 - 1:00	Lunch Provided				
1:00 - 2:00	Single Phase Meter Testing	Troubleshooting with Phasors	Hands On Self-Contained Single & PolyPhase Meter Testing	Pre-Pay Metering Utility Case Studies- Wiregrass Electric Cooperative & Georgia Power	Meter Programming Landis + Gyr
2:00 - 2:30	Networking and Refreshment Break in Exhibit Hall				
2:30 - 3:30	Service Types / Meter Forms	Pulse Metering	Hands On Transformer Rated Solid State PolyPhase Meter Testing	Leveraging AMI Data to Serve Customers: Reducing Costs Through Behavioral Change	Meter Programming Landis + Gyr Continued
3:30 - 5:00	Exhibit Hall / Hospitality				

Attend Any Class You Want

Southeastern Meter School & Conference Class Schedule

Wednesday, March 22nd

Time	Module 100	Module 200	Module 300	Module 400	Module 500
8:30 - 10:00	Polyphase Meter Theory	Alternative Energy Metering Advanced Meter System Design	Testing & Verification of Meter Installation Using Customer Load	Understanding Power Quality & Analysis Tools	Meter Programming Honeywell Elster
10:00 - 10:30	Networking and Refreshment Break in Exhibit Hall				
10:30 - 12:00	Instrument Transformer Fundamentals	Applications & Sizing of Instrument Transformers	Testing & Verification of Meter Installation Using Customer Load Continued	Impacts of Interconnected Solar on Utility Metering	Meter Programming Honeywell Elster Continued
12:00 - 1:00	Lunch Provided				
1:00 - 2:30	Distribution Transformer Connections	Reactive, KVA and 4 Quadrant Metering		Metering Communications	Meter Programming Itron
2:30 - 3:00	Networking and Refreshment Break				
3:00 - 4:00	Demand / Time of Use Metering	Applications of Multifunction Metering		Metering Communications Continued	Meter Programming Itron Continued
5:00 - 6:00	Annual Dinner in Ballroom A				
6:30 - 9:30	Casino Royale in Ballroom A				

Thursday, March 23rd

Time	Module 100	Module 200	Module 300	Module 400	Module 500
8:30 - 9:45	Residential Theft Combined Class				
9:45 - 10:15	Networking and Refreshment Break				
10:15 - 11:30	Commercial Theft Combined Class				
11:30 - 12:00	Closing Session				



Opening Session

Technology Architecture Considerations for Smart Metering & Beyond

Kathy Shaffer, *OMNETRIC Group*

Utilities are deploying smart technologies to enable new capabilities that will help them meet their commitments to stakeholders, improve network reliability and deal with the disruptive trends. In order to adapt to rapid change, utilities will need to navigate through some key technology complexities, including an evolving standards landscape, balancing short-term wins with long-term integration complexity and stewardship of data. Kathy Shaffer offers key insights into these issues and the importance of defining an end-state that is relevant to the utility's strategic goals along with a phased approach that is aligned to the utility's business objectives.

Meter Safety

Instructor: Steve Shaw, *Georgia Power*

The check out procedures for self-contained meter sockets and the results of a fault in a self-contained meter socket. Demonstrations of the proper use of protective equipment and fire retardant clothing while working in reach of an energized circuit. Discussions on various accidents experienced by meterman. Safety precautions while working inside a substation.

Module 100

Fundamental Metering

Metering Math & Electrical Fundamentals

Instructor: Mike Chirico, *South Alabama EC*

Review of basic meter math skills. This would include fractions, percentages, multipliers, ratios, algebra and how they apply to metering applications. Learn the principles of electricity, AC and DC circuit theory including ohms law and circuit components, along with current and voltage laws.

Single Phase Meter Theory

Instructor: Keith Hardt, *Pungo Engineering*

Explanation of the mechanics and electrical theory of single phase meters. Discussion of internal meter components, and how they interact to make the meter register properly.

Single Phase Meter Testing

Instructor: Trent Christian, *Georgia Power*

What does it mean to "test" a meter? This class includes discussion on testing methods and equipment along with ANSI requirements. Proper repair and maintenance of single phase meters are addressed.

Service Voltages / Types & Form Numbers

Instructor: Jeremy Morgan, *Fairhope Utilities*

Focuses on service voltages and how they relate

to meter selection. What is a meter "Form" and how does it relate to the type of service? Learn what does the nameplate information tell you. Overview of how meters, sockets and transformers are wired together? Although concentrating on single phase services, polyphase meter forms are also discussed.

Polyphase Metering Theory

Instructor: Paul Milan, *Southern California Edison*

This class will introduce the student to the principles of polyphase metering. Explanations of different configurations and the uses for polyphase meters.

Instrument Transformers Fundamentals

Instructor: Rudolf Ogajanov, *ABB*

Course is designed to teach the fundamental characteristics of Current and Potential Transformers as they are applied to electric metering. Topics include ratio, rating factor, BIL, burden, polarity and ANSI accuracy class.

Distribution Transformer Connections

Instructor: Mike McHan, Jason Waters, *Georgia Power*

Lecture on the understanding of distribution transformer connections and how to make them. A necessity to a well rounded meter person.

Demand / Time of Use Metering

Instructor: Jack Pyburn, *Honeywell Elster*

Lecture on what "demand" is and why do utilities use demand metering. It will cover different types of demand metering and technologies. This class will also cover "Time of Use" (TOU) metering and related technologies. It will address questions on why we use TOU metering and its benefits.

Module 200

Advanced Metering

Power Theory

Instructor: Brian Chandler, *City of Troy Utilities*

An expansion of the popular course on the basics of electricity – volts, amps, power factor and all kinds of good stuff. Definition and applications of KW, KVA, power factor, reactive power, and demand. Introduction to complex math and phasors.

Principles & Applications of Polyphase Metering

Instructor: Randy Riley, *Landis + Gyr*

Lecture on "What is polyphase metering." Why does the customer need this type of metering? Evolution of polyphase metering. A review of delta and wye metering applications, 2,2-1/2 and 3 element meter selection, "multi-form" meters and Blondel's Theorem. Polyphase meter wiring connections are discussed.

Installation Troubleshooting Using Phasors

Instructor: Christopher Prince, *Aclara*

An introduction to the concept of phasor diagrams – what they represent, how they are developed, and how they may be used

as effective diagnostic tools. Working with phasor information provided by new solid state electricity meters to troubleshoot new and Existing metering installations. Includes some interactive exercises diagnosing miswired meters.

Pulse / Load Profile Metering

Instructor: Bill Brayden, *Solid State Instruments*

What is pulse metering? When, why, and how you would use it in a modern day metering system. Explanations of pulse initiators, isolation relays, and pulse weight calculations.

Alternative Energy Metering

Instructor: Michael Dalton, *Georgia Power*

Learn about installing meters when the source is from alternative energy. A discussion on the components used and the safety issues. A look at the information provided for billing.

Advanced Meter System Design

Instructor: Trent Christian, *Georgia Power*

This session will cover the process of designing a large Commercial & Industrial metering installations. Review of the components necessary and the purpose of each to the application.

Applications & Sizing of Current Transformers

Instructor: Frank Lopez, *GE Digital Energy*

Learn the procedure to determine the proper current transformer size for an installation. Review the application of rating factors.

Reactive, KVA and 4 Quadrant Metering

Instructor: Victor Love, *Schweitzer Engineering*

Explore reactive metering concepts and terminology. Look at why reactive measurements are important, their impact on system losses, equipment sizing, and cost of service. Review the mathematical derivation of reactive quantities. Explanation of 4 Quadrant metering.

Applications of Multi-Function Metering

Instructor: Mike Bearden, *Landis + Gyr*

This session will cover the proper selection and application of the multi-function meter. A review of the considerations for the type of utility service.

Module 300

Meter Testing & Safety

Grounding and Bonding of Meter Enclosures

Instructor: Trent Christian, *Georgia Power*

Lecture of the proper and safe way to ground and bond a meter enclosure. National Electric Code requirements will be discussed.

Fundamentals of Single & Polyphase Field Meter Testing

Instructor: George Johnson, *Georgia Power*

Discussion on the Basic Theory, Philosophy, and ANSI Standards necessary to complete single phase and three phase meter testing. Includes details of phantom load testing and customer load testing.

Hands On Self-Contained Single Phase and PolyPhase Meter Testing

Instructors: George Johnson, Art Lowery, Will Rogers, Barry Reese, *Georgia Power*
Hands on lab allowing students to test mechanical and electronic self-contained watt-hour meters using phantom load and portable watt-hour standard.

Hands On Transformer Rated Solid State PolyPhase Meter Testing

Instructors: George Johnson, Art Lowery, Will Rogers, Barry Reese, *Georgia Power*
Hands on lab allowing students to test electronic transformer rated watt-hour meters. Using phantom load and portable watt-hour standard, three portable watt-hour standards, and newer technology test equipment. Testing from infrared test LED.

Testing and Verification of Meter Installation Using Customer Load

Instructors: Art Lowery, Will Rogers, Barry Reese, *Georgia Power*
Demonstration on how to properly check your overall meter installation and be assured of accurate billing. Class will include vector analysis, voltage measurement, CT burden verification and verifying CT ratios using latest test equipment and classroom discussion.

Residential Theft

Instructor: Paul Pulliam, *Georgia Power*
The loss of revenue through unsecured meters, the use of tap detectors, the use of check meters and other methods of theft detection, the meterman’s role in revenue protection, and how investigations are completed after a theft case is discovered.

Commercial Theft

Instructor: Paul Pulliam, *Georgia Power*
Detection of loss of revenue due to theft on Commercial accounts. Ways to prevent loss of revenue due to theft of services on Self Contained Polyphase and Instrument Transformer Rated accounts.

Module 400

Smart Grid, AMI and Emerging Technology

Cyber-Terrorism Defense - Protecting Our Nations Critical Infrastructure

Instructor: Steven Dyer, *Central Service Association*
This is a fast paced discussion on how to protect our critical infrastructure. Real world examples of hacking and demonstrations of how easy it is to break into almost any system. Cyber-Terrorism Defense informs participants not only how to combat cyber-terrorism, but also shows the history of how we came to the place we are today. It answers the question of who is really out there and why they want access to our information.

US Army Central Metering Program

Instructor: Michael Ott, *US Army Corps of Engineers*
The U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville (Huntsville Center) manages the \$230 million Army Metering Program. AMP was initiated in response to the Energy Policy Act of 2005 (EPAct 2005), which requires federal facilities to be metered with advanced meters where practical. Electric meters have been installed and connected into energy monitoring systems to provide effective, accurate reporting for timely energy management and accountability. Also have integrated installations and/or regional management systems and meters into an enterprise-wide single Meter Data Management System (MDMS). This session will be a look at how this program has been implemented and the next steps.

Next Generation Metering Technologies

Instructor: Zac Canders, *DataCapable*
The grid is actively evolving and with this comes new technologies, teams, and processes. Gone are the days where silo’d systems and solutions can fulfill all the meter-to-cash needs of an electric utility. Advancement in hardware, communications, and software are transforming the value of meters and associated metering technologies. This presentation will discuss the future of metering technology. This will include the role of machine learning, node based applications, interoperability, and standards.

Pre-Pay Metering - Utility Case Studies

Instructors: Jason Thrash, Brad Kimbro, *Wiregrass Electric Cooperative*; Ronnie Noble, *Georgia Power*
Many utilities have implemented a Pre-Pay Metering solution for their customer base. Wiregrass Electric Cooperative and Georgia Power will share the application, benefits, challenges and future with the systems they currently are providing to their utility customers.

Leveraging AMI Data to Serve Customers: Reducing Costs Through Behavioral Change

Instructors: Jamie Wimberly, Nat Treadway *DEFG*
Many utilities have adopted new technologies to improve system reliability and improve the customer experience. This session will explore how AMI can improve residential offerings. Customer expectations are changing, and utilities can develop strategies and offerings that better serve customers needs. DEFG will discuss advanced services that leverage AMI data and communicate in ways that help residential customers to reduce usage, lower bills, simplify payment, increase satisfaction, lower utility operating costs and enhance revenue recovery.

Understanding Power Quality & Analysis Tools

Instructor: Shane Reeves, *Schweitzer Engineering*
Uncover potential cost savings by visualizing system data and identifying power quality disturbances. This session will introduce the characteristics of power quality (PQ), describe, real-world PQ problems, tools for root cause analysis, and prevention measures. Learn about the impacts of Voltage sag,swell, interruption (VSSI), Harmonics, Unbalance, and more. Included also are practical ways of automating data collection and software reporting.

Impacts of Interconnected Solar on Utility Metering

Instructor: Keith Hardt, *Pungo Engineering*
The presentation covers the metering and protection requirements for the interconnection of utility scale solar generation to utility electric distribution systems. Discussion topics will include the utility interconnection process, metering, protection and safety considerations.

Metering Communications

Instructor: Michael Neas, *Schneider Electric*
This session will define the basic physical elements of a communication system and the basic elements of a communication model. Topics include how to apply and configure the physical elements and the protocol specific elements of a serial communication system. Also how to apply and configure the physical elements and the protocol specific elements of an Ethernet communication system.

**Module 500
Meter Programming**

Overview and hands on programming of manufacturers metering software. You will be creating and editing meter programs.

Laptop computers are provided but students can bring their own.

Meter Programming

- Aclara
- Honeywell Elster
- Itron
- Landis + Gyr