Southeastern Meter School & Conference

The Hotel at Auburn University
and Dixon Conference Center

Auburn, Alabama

March 18th - 21st, 2024

Sponsored by the

Southeastern Meter Technical Association

In Cooperation with

Utility TechED | UTILITY TECHNOLOGY EDUCATION

Southeastern Meter School & Conference Class Schedule

Monday, March 18th

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	"*Next Generation Utility Metering Data Trends*"				
2:30 - 3:00	Networking and Refreshment Break				
3:00 - 4:30	History of Electric Metering	Power Theory	Grounding & Bonding Meter Sockets	Identifying the Value Streams for AMI Data Leveraging AMI Integration to Provide a Better User Experience	
4:30 - 6:00	Exhibit Hall / Hospitality				

Tuesday, March 19th

Time	Module 100	Module 200	Module 300	Module 400	Module 500 A&B	
8:30 - 10:00	Electrical Fundamentals	Principles & Applications of Polyphase Metering	Fundamentals of Single & PolyPhase Field Meter Testing	What's Next - AMI System Use Now & Future Transforming AMI Data into Operational Insights	Meter Programming Aclara	
10:00 - 10:30	Networking and Refreshment Break in Exhibit Hall					
10:30 - 12:00	Single Phase Metering Theory	Applications of Multifunction Metering Intro to Vector Diagrams	Instrument Transformer Testing	Transformer Load Study - How Meters Effect the Load on a Transformer Extended Range Current Transformers	Meter Programming Alcara Continued	
12:00 - 1:00	Lunch Provided					
1:00 - 2:00	Meter Sockets - Meter Mounting Devices	Demand Metering / Time of Use & EV Metering Rates	Testing & Verification of Meter Installation Using Customer Load	Utility Roundtable	Meter Programming Itron	Meter Programming Sensus
2:00 - 2:30	Networking and Refreshment Break in Exhibit Hall					
2:30 - 4:00	Service Types & Meter Forms	Reactive, KVA and 4 Quadrant Metering	Testing & Verification of Meter Installation Using Customer Load Continued	Residential Demand Billing Load Disaggregation	Meter Programming Itron Continued	Meter Programming Sensus Continued
4:00 - 5:30	Exhibit Hall / Hospitality					

Southeastern Meter School & Conference Class Schedule

Wednesday, March 20th

Time	Module 100	Module 200	Module 300	Module 400	Module 500
8:30 - 10:00	Meter Installation Wiring	Applications & Sizing of Instrument Transformers	Meter Test Equipment Training Powermetrix	AMI at Light Speed - Leveraging Fiber Back-Haul for AMI Digital Twin Analysis	Meter Programming Honeywell
10:00 - 10:30	Networking and Refreshment Break in Exhibit Hall				
10:30 - 12:00	Instrument Transformer Fundamentals	Applications & Sizing of Instrument Transformers Continued	Meter Test Equipment Training TESCO	Metering at Distributed Energy Resource (DER) Point of Common Coupling	Meter Programming Honeywell Continued
12:00 - 1:00	Lunch Provided				
1:00 - 1:45	Distribution Transformer Connections	Troubleshooting with Phasors	Meter Test Equipment Training Radian Research	Real-Time Monitoring of Distribution Transformers	Meter Programming Landis+Gyr
1:45 - 2:30	Single Phase Meter Safety, Meter Installation & Removal			Meter Data Management & AMI	
2:30 - 3:00	Networking and Refreshment Break				
3:00 - 3:45	What is Demand Metering?	Meter Communication Technologies		Case Study on Micro-Arc Detection - AMI System	Meter Programming Landis+Gyr Continued
3:45 - 4:30	Meter Testing Concepts			Decisions on the Edge - The Transition to Customizable Edge Computing	
5:00 - 6:00	Annual Dinner in Grand Ballrom				
6:00 - 9:00	Casino Royale in Grand Ballroom				

Thursday, March 21st

Time	Module 100	Module 200	Module 300	Module 400	Module 500
8:30 - 9:30	EV Charger Combined Class				
9:30 - 9:45	Networking and Refreshment Break				
9:45 - 11:15	Revenue Protection Combined Class				
11:15 - 11:30	Closing Session				

Knowledge is Power

Opening Session

Next Generation Utility Metering Data Trends
Instructor: Ben Thomason, *Central Georgia EMC*
As technology changes in the utility industry, so does the capabilities of the next generation electric meter. Learn how utilities are using metering data in business applications and what the future holds.

Module 100
Fundamental Metering

History of Metering
Instructor: Tom Lawton, *TESCO*
Enjoy a session learning about the past art of metering and the great individuals that made it happen.

Metering Math & Electrical Fundamentals
Instructor: Mike Chirico, *Covington 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: Bryan Seal, *Itron*
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. Session will include how a solid state meter works along with the application of the meter in the electric service.

Meter Sockets - Meter Mounting Devices
Instructors: Daniel Murray, *The Durham Company*
Course is designed to teach the fundamental characteristics of meter sockets. A variety of sockets will be used to demonstrate construction, features, types, and application in electric service.

Service Types & Form Numbers
Instructor: Tim Hope, *Alabama Power*
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.

Meter Installation Wiring
Instructor: Keith Hardt, *Pungo Engineering*
Review of typical metering installations with emphasis on the ANSI meter wiring diagrams. A discussion of Blondel vs Non-Blondel compliant meter measurements. Also a discussion on some common metering installation errors.

Instrument Transformers Fundamentals
Instructor: Andrew Peterson, *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: 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.

Meter Safety
Instructor: Terrell Walton, *Alabama 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.

Demand Metering
Instructor: Tina Pampanelli, *Itron*
Learn about demand metering to gain a better understanding on how this value is calculated and applied to the billing structure.

Meter Testing Concepts
Instructor: Randy Campbell, *Radian Research*
Session will provide an overview of testing single phase metering. Discussion will include the application and safety of testing single phase meters. Emphasis will be on shop testing.

Module 200
Advanced Metering

Power Theory
Instructor: Paul Millan, *Southern California Edison*
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 power triangle, KW, KVA, power factor, reactive power, and demand.

Principles & Applications of Polyphase Metering
Instructor: Gautham Ashokkumar, *Schweitzer Engineering*
Lecture on 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.

Applications of Multi-Function Metering
Instructor: Diego Barquero, *Landis+Gyr*
Session will cover the proper selection and application of the multi-function meter. Review of the considerations for the type of utility service.

Introduction to Vector Diagrams
Instructor: Steve Hudson, TEC *Powermetrix*
An introduction to the concept of vector / phasor diagrams.

Demand Metering / Time of Use & EV Metering Rates
Instructor: Sy Schreiner, *Alabama Power*
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.

Reactive, KVA and 4 Quadrant Metering
Instructor: Bill Mulkey, *Schneider Electric*
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 & Sizing of Current Transformers
Instructors: Ryan Alkire, Frank Lopez, *GE Vernova*
Learn the procedure to determine the proper current transformer size for an installation. Review the application of rating factors. Multi-Range current transformers will be covered in this session. Review of primary metering installations

Troubleshooting Using Phasors
Instructor: Carl Chermak, *Aclara*
Learn about 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.

Metering Communication Technologies
Instructor: Sean Dempsey, *Honeywell*
Review of a variety of communication technologies used in meter. Discussion on equipment and proper applications.

Module 300
Meter Testing, Safety & Revenue Protection

Grounding and Bonding of Meter Enclosures
Instructor: Zach Dew, *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: Ted Pollard, *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.

Instrument Transformer Testing
Instructor: Tom Lawton, *TESCO*
The importance of instrument transformer tests is often underestimated. Current and voltage transformers for metering purposes must have a high degree of accuracy to ensure precise billing. Course is designed to teach all aspects of testing instrument transformers.

Testing and Verification of Meter Installation Using Customer Load
Instructors: Zach Dew, Ted Pollard, *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.

Powermetrix - Meter Test Equipment Training
Instructor: Steve Hudson, TEC *Powermetrix*
Verification of electrical meter sites is crucial to ensure proper metering and billing for your utility. This class will cover the hardware and software used to perform a full meter site inspection for forms 9S, 5S/45S, 4S, and 3S meters on a live test board. Tests include waveform and vector diagram review, harmonic analysis, customer and phantom load testing, CT burden plus ratio testing, and CT burden measurement. Several meter site issues that result in reducing billing will be covered, along with the methods to identify and fix these problems. Students will learn about real stories from the field. Session includes an overview of the Powermaster 6618A field analyzer and 335V load box.

TESCO - Meter Test Equipment Training
Instructor: Vernon White, *TESCO*
The session will be a hands on class that will include the importance of performing a full analysis while at your transformer rated meter site with hands on training, validation of both your instrument transformers and meters in the meter shop prior to field deployment of these devices including hands on training on how to perform some of these tests, data analysis and troubleshooting along with case studies and real-world applications.

Radian Research - Meter Test Equipment Training
Instructor: Randy Campbell, *Radian Research*
The session will cover Shop, Field, and Lab Equipment used in the testing of electric revenue meters. The electric meter is the cash register for the utility, and it is important to test these meters with the test equipment that is reliable and has traceability to NIST. The Shop Test equipment portion of the class will cover the capabilities of the 4000 series test boards and the processes used in testing meters. The Field Equipment section will discuss the RW-3X site analyzer and how it is used at a polyphase meter site to test meter installation wiring, CT's and the meter. Lastly the class will cover reference standards and their role in keeping revenue meters and the test equipment traceable to NIST.

EV Charger
Instructor: Eric Lambert, *Aclara*
Discussion on the common sense approach to utility management of EV load growth and reduction of load impact on the traditional power delivery system.

Revenue Protection
Instructor: Doug Stephens, *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.

Module 400
Smart Grid, AMI and Emerging Technology

Identifying the Value Streams for AMI Data
Instructor: Patrick Jordan, *NRTC*
The first question asked by many utilities beginning evaluation of a next generation AMI system is "what can we can do with the data from a new system". This session will strive to help define the use cases of AMI data and how the utility can leverage the data to enhance member satisfaction as well as provide more granular insight into consumer habits for advanced rate design.

Leveraging AMI Integration to Provide a Better User Experience
Instructor: Patrick Jordan, *NRTC*
User satisfaction and ease of use should be two priorities when selecting an AMI system. Successful integration of the AMI platform into existing user systems is the first step to enable a fully functional system. Users who are able to gain access to information while remaining in their native systems are much more likely to become "super" users and proponents of the deployment.

What's Next - AMI System Use Now & Future
Instructor: Shawn Collins,*Utility Specialists, Inc.*
Discussion on what utilities are currently using with their AMI systems and what else there is they could look at in the future. Some of the topics will be transformer monitoring, asset protection, power quality, data analytics along with grid edge devices and sensors.

Transforming AMI Data into Operational Insights
Instructor: Jacob Chacko, *EATON*
The growth of data available from AMI systems brings with it new opportunities to understand and manage distribution systems. Analysis of this data can play a critical role in the operations of the electric distribution system. As we move forward into Energy Transition & Grid Modernization, data analytics can assist in maintaining the security, safety, and optimal operation of the electric distribution system. Session to include an understanding of what types of data are required to deliver meaningful analytics.

Transformer Load Study - How Meters Effect the Load on a Transformer
Instructor: Blair Hill, *Central Service Association*
Session about how Transformer Load Study works to show how meters effect the load on a transformer. Also will cover a breakdown of the meters tied to a transformer so that a utility can properly size a transformer based on the meters attached to a certain transformer.

High Accuracy, Extended Range Current Transformers
Instructor: Ryan Alkire, *GE Vernova*
This session will focus on how the metering industry is utilizing the High Accuracy Extended Range (HAER) current transformers to streamline the utilities inventory and generate more revenue. This session will cover the following topics: - What affects the accuracy of current transformers? - What makes a high accuracy extended range different from a standard accuracy CT? - What are the benefits to the utility? - What is the downside to making the switch to HAER?

Utility Roundtable
Instructor: Variety of Utilities
Share and listen to utilities discuss common issues with metering at their utility.

Residential Demand Billing
Instructor: Jason Thrash, *Wiregrass Electric Cooperative*
Learn about the purpose and implementation of a Residential Demand Billing rate.

Load Disaggregation
Instructor: Eric Doolittle, *Georgia Power*
Load Disaggregation breaks energy usage down into appliance/category level, so customers have a better understanding of what they are using their household electricity on. It is important to observe patterns and build energy signature profiles for each appliance for an effective estimation of the power required in the near future. Discussion on how a utility can benefit from this application.

Merging Fiber to the Home with AMI
Instructor: Bryan Seal, *Itron*
This sessions provides an overview of market trends within the exponentially growing fiber to

the home (FTTH) services and how utilities are trending to incorporate AMI devices into their fiber network. Topics include a market update, overview of typical fiber network elements, architectural considerations for maximizing bandwidth or lowering costs.

Digital Twin Analysis
Instructor: Bill Mulkey, *Schneider Electric*
Session on integrating analysis software with real time information to do analysis using real time operating conditions. Digital Twin software replicates one-line diagrams and build models for each piece of equipment and connect to devices directly or through monitoring software to import actual conditions when doing analysis.

Metering at DER Point of Common Coupling
Instructor: Gautham Ashokkumar, *Schweitzer Engineering Lab*
Session on the challenges to metering at a distributed energy resource (DER) point of common coupling, and on the solutions available. Bi-directional metering and power quality metering requirements specific to IEEE 1547 will be the focus of this presentation.

Redefining the Grid Edge with Real-Time Monitoring of Distribution Transformers
Instructor: Charlie Nobles, *Ubicquia*
Review of multiple utility use-cases involving the monitoring of critical distribution assets (transformers & poles) and user loads with the ability to integrate the data from other devices (meters, feeder sensors, etc.) to provide granular analysis of system health, improve reliability and provide relevant event information for operational decisions. The true value of expanded visibility of system performance and operation back from the meter to the substation will be explored, providing accurate input for informed decisions for optimized power delivery, cost avoidance and maximizing the quality of energy supply.

Meter Data Management & AMI
Instructor: Paul Fratellone, *OATI*
Understanding the capabilities of MDMS in utilities can unleash a wide spectrum of efficiencies. As meters become more powerful with more memory and processing power, these new edge devices will carry more raw data and the MDMS can then transform it into actionable insights that will drive operational efficiency in energy resource management.
At the heart of the MDMS, is its ability to process mountains of data from a myriad of interconnected smart devices (like inverters, meters) and enable informed decision making and strategic planning.
As utilities embrace a digital future, a robust MDMS becomes inevitable and eventually cost-effective. By efficiently managing complex data, validating its accuracy, integrating it seamlessly, and offering advanced analytics, an MDMS paves the way for improved operations, better decision-making, and enhanced customer satisfaction. With the right MDMS, utilities can not only overcome their current challenges but also gear up for future opportunities.

Case Study on Micro-Arc Detection - AMI System
Instructor: Tom Lawton, *TESCO*
This presentation provides a detailed look into case studies that TESCO performed with utilities on micro-arc detection as part of their AMI system and what they learned from their meter population. The presentation touches on the following points:
* What is Micro-Arc Detection
* How is Micro-Arc Data Captured and Used
* Important Parameters and Takeaways
* 2 Utility Case Studies
* Arcing Properties
* Utility Variables
* Which Meters have this Technology

Decisions on the Edge - The Transition to Customizable Edge Computing
Instructor: Derl Rhoades, *Sensus*
The session will talk about the trend to customizable edge computing. The presentation will highlight the benefits and challenges as the industry trends to a new required way of operating the grid. It will specifically point out the meters role in the grid of the future and why it will need to be customizable for each utility.

Module 500
Meter Programming

Creating and editing of manufacturers metering software.
Laptop computers are provided but students can bring their own.

Alcara - Meter Programming
Instructors: Carl Chermak, Dale Prashad, *Alcara*
Learn to create a simple demand meter program with Alcara MeterMate software. Review the KWH and KW Demand information required from the meter and instantaneous measurements desired in the alternate display. Additional meter settings will be covered in building the meter program.

Itron - Meter Programming
Instructor: Tim Royster, *WESCO*
Learn about Itron's software meter programming suite PC-PRO+ Advanced! This class will provide a broad overview of all of the software capabilities, system management, and how to create meter configuration files to meet your specifications. From setting up the software, creating your user interface, to managing all of the security and management settings in creating a program file, will make you proficient with this software. Will also include an overview of Field-Pro, which will allow user to optically communicate with the meter, whether you are troubleshooting or creating a meter data file for later review.

Sensus - Meter Programming
Instructor: Sean McCarty, *Sensus*
Sensus FlexNet Spotlight offers streamlined communication with meters and devices. Use FMT or optical probes to confidently add, configure, and manage meters securely with FlexNet messaging. The FlexNet Automated Shop Tool (FAST) enables easy configurability and verification of settings for optimized workflows. Customize Config/Verify creates tailored configuration files. Update firmware, create scripts, and edit easily using the Batch Menu. Prioritize security through dedicated settings. Manage file systems, logging, and app settings seamlessly in the user-friendly Settings Menu.

Honeywell - Meter Programming
Instructor: Sean Dempsey, *Honeywell*

Landis+Gyr - Meter Programming
Instructor: Diego Barquero, *Landis+Gyr*