



Southeastern Meter School & Conference

The Hotel at Auburn University
and Dixon Conference Center

Auburn, Alabama

March 13th - 16th, 2023

Sponsored by the
Southeastern Meter Technical Association

In Cooperation with



Southeastern Meter School & Conference Class Schedule

Monday, March 13th

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	TESCO "DC Metering"				
2:30 - 3:00	Networking and Refreshment Break				
3:00 - 3:45	Trends in the Distributed Energy Resources (DER) Space				
3:45 - 4:30	EV Charging - Grid Impacts & Customer Charging Programs				
4:30 - 6:00	Exhibit Hall / Hospitality				

Tuesday, March 14th

Time	Module 100	Module 200	Module 300	Module 400 A&B	Module 500 A&B	
8:30 - 10:00	Electrical Fundamentals	Power Theory	Grounding & Bonding Meter Sockets	Using AMI Data for Operational Use Cases	Meter Programming Landis + Gyr Meter Programming Sensus	
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	Metering Renewable Energy	Meter Programming Landis + Gyr Continued	Meter Programming Sensus Continued
				Meter Manufacturer Honeywell		
12:00 - 1:00	Lunch Provided					
1:00 - 2:00	Single Phase Meter Safety, Meter Installation & Removal	Applications & Sizing of Instrument Transformers	Hands On Self-Contained Single & PolyPhase Meter Testing	Using AMI Data to Detect Safety Issues	Meter Manufacturer Landis + Gyr	Meter Programming Honeywell
2:00 - 2:30	Networking and Refreshment Break in Exhibit Hall					
2:30 - 4:00	Service Types & Meter Forms	Applications & Sizing of Instrument Transformers Continued	Hands On Transformer Rated Solid State PolyPhase Meter Testing	AMI Coverage for Indoor Metering Rooms	Meter Manufacturer Itron	Meter Programming Honeywell Continued
				Dynamic Metering Applications	Meter Manufacturer Sensus	
4:00 - 5:30	Exhibit Hall / Hospitality					

Southeastern Meter School & Conference Class Schedule

Wednesday, March 15th

Time	Module 100	Module 200	Module 300	Module 400 A&B		Module 500
8:30 - 10:00	Meter Installation Wiring	Applications of Multifunction Metering Intro to Vector Diagrams	Testing & Verification of Meter Installation Using Customer Load	Utility Roundtable		Meter Programming Itron
10:00 - 10:30	Networking and Refreshment Break in Exhibit Hall					
10:30 - 12:00	Instrument Transformer Fundamentals	Troubleshooting with Phasors	Testing & Verification of Meter Installation Using Customer Load Continued	AMI & Meter System Applications - Utility Panel		Meter Programming Itron Continued
12:00 - 1:00	Lunch Provided					
1:00 - 1:45	Distribution Transformer Connections	Reactive, KVA and 4 Quadrant Metering	Instrument Transformer Testing	Linking Meters to Transformers & Beyond	Zero Infrastructure AMI	Meter Programming Alcara
1:45 - 2:30				Merging Fiber to the Home with AMI	Emerging Technologies of AMI & Physics of RF Propagation	
2:30 - 3:00	Networking and Refreshment Break					
3:00 - 3:45	Meter Testing Concepts: Shop Testing	Demand Metering / Time of Use & EV Metering Rates	Field Testing Challenges of Renewable Energy Installations	High End Inter-Tie Metering	Tactical Advanced Metering Applications	Meter Programming Alcara Continued
3:45 - 4:30	Single Phase Meter Field Testing			Power Quality & Renewables	Avoiding Failures in New Technology Deployments	
5:00 - 6:00	Annual Dinner in Grand Ballroom					
6:00 - 9:00	Casino Royale in Grand Ballroom					

Thursday, March 16th

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

Knowledge is Power

Opening Session

DC Metering

Instructor: Tom Lawton, TESCO

Will DC share the limelight with AC and will no longer be a relic of the past? The answer is yes! The evolution of DC applications leads to the evolution of DC Metering's form factors. Learn how today's technology can deliver cost effective DC metering with accuracies and environmental performance like AC meters.

The new standard ANSI C12.32-2021, Electricity Meters for the Measurement of DC Energy establishes acceptable performance criteria for revenue grade DC watt-hour meters and demand meters. The advancement and growth of distributed renewable energy is driving the initial use cases for DC meters, but additional DC meter applications are quickly evolving, including DC EV fast-charging, electrified transportation infrastructure, indoor agriculture, expanded information and communications infrastructure, and peer-to-peer connection of bi-directional microgrids.

Trends in the DER Space

Instructor: John Steinberger, Itron

The adoption of distributed energy resources (DER) such as battery storage, electric vehicles, demand response, and solar invertors is accelerating due to economic, environment and market drivers. This shift can present unique challenges to electric power utilities from a monitoring / control and grid protection aspect. Learn about recent shifts and major trends in this space.

EV Charging - Grid Impacts & Customer Charging Programs

Instructor: John Steinberger, Itron

Transportation Electrification is bringing the most significant changes to the electric utility industry since the advent of air conditioning in the 1950's. Peak Load Demand... Off peak pricing...

Transformer protection... are commonplace discussion topics. Through both Behavioral EV Charging and Managed EV Charging programs utilities have experienced encouraging results in the receptiveness of customers to modify charging behavior. Hear how one utility implemented an EV charging program that attained a 76% off peak charging success rate within 4 months.

Students will gain an understanding of how another utility implemented a successful EV behavioral charging program along with learning the difference is between behavioral off peak charging programs and true managed EV charging programs. Shared in this is what to consider in developing an EV charging program for your utility. Including off peak / TOU rate plans, vehicle telematics versus charger data acquisition methods and releasing a customer facing EV charging app.

Module 100 **Fundamental Metering**

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 Safety

Instructor: Robbie Anastasio, 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.

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: Joe Ries, Michael Griffin Ritz Instrument Transformers

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 Testing Concepts

Instructor: Bob Whitmore, 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.

Single Phase Meter Field Testing

Instructor: Stephan David, Probewell

Session will provide an overview of equipment and procedures for testing single phase metering in the field.

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: Jeremy Blair, 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.

Applications & Sizing of Current Transformers

Instructor: 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.

Introduction to Vector Diagrams

Instructor: Steve Hudson, Powermetrix

An introduction to the concept of vector / phasor diagrams.

Installation 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.

Reactive, KVA and 4 Quadrant Metering

Instructor: Nathaniel Dunn, *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.

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.

Module 300

Meter Testing & Safety

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: Eden Estep, *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: Zach Dew, Eden Estep, *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: Zach Dew, Eden Estep, *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: Zach Dew, Eden Estep, *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.

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.

Field Testing Challenges of Renewable Installations

Instructor: Steve Hudson, *Powermetrix*

With an increase in renewable energy sites on the utility grid, it is important to understand the challenges in metering the installations. This session will focus on how renewable sites are metered and what is important when verifying a site.

Revenue Protection - Residential Theft

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.

Revenue Protection - Commercial Theft

Instructor: Doug Stephens, *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

Using AMI Data for Operational Use Cases

Instructor: Van Holsomback, *EPRI*

Discussion of EPRI project that specifically focuses on approaches to integrate AMI data with OMS, GIS, and DMS systems to identify hazardous conditions, inform grid management decisions and improve operations.

Metering Renewable Energy

Instructor: Keith Hardt, *Pungo Engineering*

Learn about installing meters when the source is from alternative energy. This session covers the metering and protection requirements for the interconnection of utility scale renewable generation to utility electric distribution systems. Discussion topics will include the utility interconnection process, metering, protection and safety considerations and components used.

Using AMI to Detect Safety Issues in Services

Instructor: Tina Pampanelli, *Itron*

Discussion how utilities are using arc detection coupled with high temperature sensing, and

Distributed Intelligence high impedance measurement in AMI meters to detect safety issues in services.

AMI Coverage for Indoor Metering Rooms & Vaults

Instructor: Jesus Batista, *Alabama Power*

Explore the benefits of using Leaky Coax (DAS) alongside a Sensus base station inside indoors meter rooms or vaults. Session will include discussion on poor meter read performance inside vault meter rooms and how to effectively reach multiple meter rooms at apartment complexes using DAS.

Dynamic Metering Applications

Instructor: Nathaniel Dunn, *Schneider Electric*

Learn about applications of high end metering at the Point of Interconnection (POI). Include examples of renewable generation with Battery Energy Storage System (BESS), multiple meters on low side of transformer being totalized and compensated to high side of transformer.

Next Generation Meter Functionality

Instructors: Variety of Meter Manufacturers

Learn about the direction and capabilities of the next generation meters from a variety of meter manufacturer companies.

AMI & Meter System Applications

Instructors: Jeff Butts, *Tampa Electric*; Jeremiah Seal, *Southern Pine EC*, Eric Doolittle, *Georgia Power*; Greg Calloway, *West Florida EC*

This session will be an opportunity to learn from utilities about the current and future applications with their AMI system.

Linking Meters to Transformers & Beyond

Instructor: Derl Rhoades, *Sensus*

GIS systems are only as good as the data fed into them. So, it goes to reason that connectivity models aren’t always as accurate as utilities would like. However, though a combination of metrology, communications, and analytics, utilities can determine the distribution phase and the transformer connectivity of each meter. This session will explore the phase detection capabilities of Smart Meters and real-world examples of utilities that are using AMI to keep their connectivity models accurate.

Zero Infrastructure AMI

Instructor: Jon Scott, *TESCO Nighthawk*

This session will include case studies exploring the use of zero-infrastructure AMI to provide everything from fully deployed AMI systems to tactical installations. Will provide an overview of the technologies involved in a zero-infrastructure solution.

Merging Fiber to the Home with AMI

Instructor: Bryan Seal, *Itron*

Discussion of fiber system architecture and how utilities are leveraging their fiber infrastructure for utility use such as AMI.

High End Inter-Tie Metering

Instructor: Sal Cardella, *AMETEK Power*

Instruments

Learn about the key functionality of High End utility metering - What are They, Where Used, Typical Applications.

Tactical Advanced Metering Applications

Instructor: Elias Behar, *Honeywell*

By using more affordable cellular (LTE Cat-M1) technology to deliver more data, more frequently, this session will explore a handful of use cases where utilities can address specific niche applications without changing out their entire metering / AMI setups and without impacting the performance of existing systems.

Power Quality & Renewables

Instructor: Sal Cardella, *AMETEK Power*

Instruments

What is power quality and why is it important to the utility system. Discussion on the most common types of power quality issues and what causes them. Better understand the impact of renewables and power quality on the system.

Avoiding Failures in New Technology Deployments

Instructor: Tanu Jacobs, *Honeywell*

What are the typical causes of failure when deploying a new technology project at a utility and what are some of the ways the utility can avoid those failures?

Module 500

Meter Programming

Creating and editing of manufacturers metering software.

Laptop computers are provided but students can bring their own.

- Aclara
- Honeywell Elster
- Itron
- Landis + Gyr
- Sensus