



## 2019 Mississippi Electric Meter School

### Metering 1

<b>Basic Electricity</b>	This class will provide a general overview of the physics behind electricity.
<b>Basic Math</b>	This session will cover the empirical calculations in Ohm's Law and explains ways of determining voltage, current, resistance, and power. Also covered are applications for single-phase and three-phase motors.
<b>Basic Troubleshooting</b>	This course will teach the participants the proper way to inspect a meter base safely and the problems that could be encountered.
<b>Meter Terms</b>	There is an abundance of terminology related to electrical metering. This course will define common meter terms and how they relate to metering.
<b>Transformer Connections</b>	This session looks at transformer banking and covers the different banking connections.
<b>Demand Metering</b>	Course answers the question "What is demand?" and "Why do we use it?". It will cover methods of calculating demand using interval data. Also covered in this course is the topic of Pulse-metering and how it is used today.
<b>Basic Code Requirements</b>	This course will go over the requirements pertaining to metering as set forth in the National Electric Code (NEC).
<b>Time of Use</b>	This course will answer the question of what TOU is, the reasoning behind TOU billing, and what its benefits are.

### Metering 2

<b>Three -Phase Mathematics</b>	This course will cover the basic mathematical principles to perform electrical calculations for three-phase networks. Students will look at calculating KW, KVA, and power factor.
<b>Transformer Theory</b>	A look into how transformers work and the theory behind them.
<b>Current and Potential Transformers</b>	This course will dive into the theory behind using current and potential transformers for metering.
<b>Transformer Rated Metering</b>	This course will cover meter installations requiring the use of current and potential transformers. Students will learn the more common form types and how Blondel's theorem applies to these types of meters.
<b>Power Quality and Using Phasors</b>	This course will explain common power quality issues and talk about ways to monitor and mitigate them by using phasor diagrams.

<b>Communications and Trouble Shooting</b>	This course will cover basic communication terminology and definitions. Will talk about modern communication methods and how to test and troubleshoot them.
<b>Demand Metering</b>	Course answers the question "What is demand?" and "Why do we use it?". It will cover methods of calculating demand using interval data. Also covered in this course is the topic of Pulse-metering and how it is used today.
<b>Distributed Generation</b>	This course will discuss the different types of on-site generation, their impact on utilities, and how utilities are metering them.
<b>Four Quadrant Metering</b>	This course will focus on reactive metering concepts and how they affect the distribution system.

## Meter Testing

<b>Meter Testing: Simple Metrics Theory and Philosophy</b>	Lecture class to discuss the terms, methods, and tools used to properly test simple energy and demand. Subjects included are NIST, time and interval-based testing methods, phantom load versus customer load tests, and laboratory and field-testing variables.
<b>Meter Testing: Complex Metrics Theory and Philosophy</b>	Lecture class to discuss the terms, methods, and tools used properly test reactive components of metering, analog, pulses, and digital meter metric export data such as ModBus and DNP.
<b>Practical Testing Methods</b>	Hands on course taught by experienced meter professionals on how to properly test meters, in both laboratory and field settings. This course teaches the use of both modern and varied testing techniques.

## Meter Programming

<b>Manufacture Meter Programming</b>	TBA
<b>Complex Measurements Beyond Energy and Demand</b>	A generalized discussion and lecture on the capabilities of present day multi-functional meters. Discussion includes power quality capture, loss compensation, notifications, mass memory selection and programming.

## Industry Trends

<b>AMI: Beyond Meter to Cash</b>	Leveraging AMI and advanced data analytics beyond customer billing to gain greater visibility into your distribution networks. Utilities are increasing relying on analytics to help drive operational efficiencies and to improve customer service delivery for its customers. Combining AMI with IoT, Demand Management and Operations Data Management technologies are bridging the technology gap and allowing staff to more easily actionize and leverage data well beyond simply printing customer bills each month. This session will touch on several real-world use cases and applications of analytics that operations staff can incorporate into their functions to improve decision making.
<b>Security Ideas for the Modern Utility</b>	In todays world, security is at the forefront of many topics in the industry. This session will cover cyber security and discuss physical security ideas for

	buildings and substations. The goal is to cover easy thing a utility can do to increase their security posture
<b>Gluing it All Together: An update on industry standards and alliances making utility metering communications and networks interoperable</b>	Don't miss the future! The discussion will bring together current thought and activities in the area applicable meter communications standards, network standards, and industry alliances such as Wi-Sun in the industry's quest for multi-use networks and "plug and play" devices.
<b>101 Guide to High Performance Network Installations</b>	This session begins with an introduction to RF physics and provides a basic understanding of how radio waves behave in a given environment. It covers practices for both collector and router installations and discusses network optimization and how to take your RF mesh to peak performance by reducing layer counts, extending range and taking advantage of structure and terrain.
<b>Advancements in AMI</b>	This session will introduce participants to the fundamentals of a smart metering system. Topics covered include; communications networks, back-office software tools, meter diagnostics and reporting, and industry trends. Session will also discuss common concerns associated with AMI and benefits realized by utilities.
<b>AMI Technologies User Roundtable</b>	This is a closed-session, user-lead discussion about current AMI solutions.
<b>AMI/Internet of Things (IoT) Convergence via Hybrid Wireless Networks</b>	Gain an understanding of the Internet of Things (IoT), M2M, and telemetry. Discover how various networks such as fiber/broadband, RF Mesh, Cellular, and point to multipoint RD can best be utilized for your requirements.

## Apparatus

<b>System Protection</b>	Study of Substation and feeder protection against power system faults and protection zones
<b>Voltage Regulator Applications</b>	Study of how voltage regulators are utilized in the distribution system and how they operate
<b>Capacitor Applications</b>	Study of the various applications for capacitors in the distribution system
<b>Over-voltage Protection</b>	Study of how surge arresters operate and the purpose for surge arresters in the distribution system
<b>IED Communications</b>	Study of communications with substation and downline IEDs and the value of the data received from the IEDs due to communications
<b>Protective Grounding</b>	Study of touch and step potential, ground potential rise, and grounding procedures