

## UPCOMING EVENTS

- Cold Rolling Fundamentals –  
A Practical Training Seminar  
12–16 September 2021  
The Battle House Renaissance Mobile Hotel & Spa  
Mobile, Ala., USA
- Maintenance Solutions: Fundamentals  
and New Frontiers  
21–23 September 2021  
Embassy Suites San Antonio Riverwalk  
San Antonio, Texas, USA
- Specialty Alloy and Foundry –  
A Practical Training Seminar  
21–23 September 2021  
Sheraton Columbus Hotel at Capitol Square  
Columbus, Ohio, USA
- Secondary Steelmaking Refractories –  
A Practical Training Seminar  
5–7 October 2021  
The DoubleTree by Hilton Colorado Springs  
Colorado Springs, CO, USA



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# ELECTRICAL ENGINEERING BASICS

12–15 SEPTEMBER 2021

The Battle House Renaissance Mobile Hotel & Spa  
Mobile, Ala., USA

## ABOUT THE PROGRAM

Electricity is everywhere — no steel mill operates without it. Everything from the coffee pot to the lights to the massive surge of energy to melt in the electric arc furnace. This course is designed for those who would like to have a basic knowledge of electrical engineering principles as applied in the steel industry. Attendees will gain a fundamental basis for applying these principles in their everyday work — the terminology, the application, the physical equipment, designs, process controls and automation. The relationship of hardware and controls will be highlighted, and much more.

Automation and control are needed to operate lines optimally. This program will explore power distribution, protective relaying, transformers, breakers, level 1/level 2 automation, sensors, gauges, drives and motors. Attendees will leave this course with a better understanding of electrical engineering basics as explained by mill personnel. Panel discussions will provide an opportunity to discuss issues and engage in problem-solving. Networking sessions will allow for conversations with mill experts.

## WHO SHOULD ATTEND

Anyone who would like to expand their knowledge and understanding of basic knowledge of electrical engineering principles as applied in the steel industry should attend. This includes electrical, mechanical, lubrication and metallurgical engineers; maintenance personnel; and operators.

## ORGANIZED BY

AIST's Electrical Applications Technology Committee.



**BRING YOUR OWN  
YOUNG PROFESSIONAL**

Visit [AIST.org/byoyp](http://AIST.org/byoyp) for more information.

## PROFESSIONAL DEVELOPMENT HOURS

This course may qualify for up to 17.50 Professional Development Hour (PDH) credits. Each attendee will receive a certificate listing the quantity of PDH credits earned for the course. This course is not approved for PDH credit in New York, Florida, North Carolina and Oklahoma.

## REGISTRATION INCLUDES

Breakfast and lunch Monday–Wednesday, reception Sunday and Tuesday, plant tour with bus transportation, and a course workbook or flash drive including presentations.

**AIST MEMBERS  
US\$1,095**

**NON-MEMBERS  
US\$1,340**

## HOTEL ACCOMMODATIONS

A block of rooms has been reserved at the Battle House Renaissance Mobile Hotel & Spa. Please call the hotel at +1.866.316.5957 by 20 August 2021 to secure the AIST discount rate of US\$139 per night for single/double occupancy.

## ATTENTION NON-MEMBERS

Non-member registration fees include membership in AIST through 31 December 2022. Membership is not automatic. A completed membership application must be returned to AIST.



**FEATURED PLANT TOUR**

AM/NS Calvert LLC

**AIST.ORG**

# SCHEDULE OF EVENTS



## Sunday, 12 September 2021

4–6 p.m.  
Registration

6–7 p.m.  
Welcome Reception

## Monday, 13 September 2021

7 a.m.  
Registration and Breakfast

8 a.m.  
Introductions and Opening Remarks

Kevin Bort, TMEIC Corp. Americas

The following presentation will welcome attendees to the course and give a brief overview of the following topics for each day. The course is structured to build on the information presented the day before, and groups topics by major operating centers in a typical mill. Power distribution and hot end will be covered throughout day one, while system automation models, gauging and motors will be covered day two, wrapping up with how all the systems tie together in day three. Further discussion on how to become involved with AIST and the Electrical Applications Technology Committee will be included.

8:45 a.m.  
Power System Fundamentals 1 – Essential Concepts

Ramesh Khajiyam, Primetals Technologies USA LLC

This section of the course covers the essential power system concepts such as definitions of LV/MV/HV and EHV; three-phase power; how to interpret single-line drawings, three-line drawings and elementary schematics; the concept of per unit; base units; Thevenin equivalent; and simplified short-circuit calculations. The fundamentals and constraints of general power system design and operation will be reviewed and examined, such as voltage drop and current constraints in design, fault contribution, motor sizing requirements, etc. Grounding fundamentals and some basic power quality concepts will also be covered.

9:30 a.m.  
Break

9:45 a.m.  
Power System Fundamentals 2 – Intermediate Concepts

Anil Kanagala, Primetals Technologies USA LLC

Using the key fundamentals from the “Essential Concepts” section, this presentation will introduce the basics of the more advanced topics in power systems such as modeling, analysis, protection and power quality. Commonly used power system equipment will be discussed, such as buses, cables, transformers and motors, and their protection and design philosophy will be reviewed. Commonly encountered power quality issues will also be covered. A teaser for more advanced topics is provided at the end to kindle additional interest in power system engineering.

10:30 a.m.  
Hot Mill Power Distribution

Thomas Dionise, Eaton Corp., and Sam Rawson, JNE Consulting

This session will cover hot mill designs, pre-heat furnace and reversing rougher. It will review the supporting electrical distribution system topologies and the electrical equipment comprising the system, including switchgear, motor control centers, motor-generator sets, variable frequency drives and motors. Hot mills with both legacy DC drives and newer AC drives will be considered as well as upgrades to DC drive-based mills involving replacement of motor generators with static rectifiers. The unique nature of the hot mill electrical load will be described in terms of impact on system voltage, harmonics produced, duty cycle power loading and reactive demand.

11:15 a.m.  
Cold Mill Distribution

Gary Sindera, Steel Dynamics Inc. – Flat Roll Group Heartland Division  
This presentation introduces the subject of power supply and distribution as related to typical cold mills.

Noon  
Lunch

1 p.m.  
Galvanizing Line Power Distribution

Anil Kanagala, Primetals Technologies USA LLC

This session will cover galvanizing line designs, zinc pot furnace and emergency requirements. It will review the supporting electrical distribution system configurations and the electrical equipment comprising the system, including switchgear, motor control centers, emergency generator sets, variable frequency drives and motors. The continuous nature of the continuous galvanizing line and its effect on power system will be discussed. The nature of welders and drives and their effect on power quality of the power system will be described in terms of impact on harmonics produced, duty cycle power loading and reactive demand.

1:45 p.m.  
Break

2 p.m.  
Types of Furnace Systems

Elise Rowe, SMS group Inc.

This presentation will illustrate the electrical and mechanical fundamentals of electric arc furnace operation, with a focus on process power. A comparison of two types of furnace systems, AC and DC, will be discussed, including consideration factors for selecting the appropriate system for a new electric arc furnace.

2:45 p.m.  
Caster Automation

John Harvey, SMS group Inc.

3:30 p.m.  
Break

3:45 p.m.  
Meltshop Auxiliary Systems

Bill McCabe, Schust

## Tuesday, 14 September 2021

7 a.m.  
Breakfast

8 a.m.  
System Automation, Models, Level 2, Level 1 and Level 0

Eoin Prendergast, TMEIC Corp. Americas

Basic introduction to automation, outlining the standard levels/pyramid. The presentation will start with level 0: I/O, drives and motor control centers. Discussion of level 1 will include programmable logic controllers (language for coding; proportional, integral and derivative), human-machine interface/supervisory control and data acquisition. Level 2 discussion will include 2 tracking, setup, pacing and models. Level 3 topics will include manufacturing execution systems, enterprise resource planning and the future of automation.

8:45 a.m.  
Models – What Are They? What Do They Do?

Hrishikesh Kulkarni, TMEIC Corp. Americas

This presentation will cover process model technology in automation. It will provide an introduction to hot strip mill models and system modes of operations, a basic functional outline of roughing mill setup, roll thermal and wear modeling, holding transfer tables, finish mill setup, shape setup, and temperature control models. A general overview of first principle modeling, advanced adaptation methods, data analysis and tune-up tools will be given.

9:30 a.m.  
Break

9:45 a.m.  
Level 2 – What Is It?

Paul Jackson, TMEIC Corp. Americas

This presentation will serve as an introduction to current level 2 supervisory systems for metals control systems. It is intended for those with little or no knowledge on the subject.

10:30 a.m.  
Level 1/Level 0 – An Overview of PLCs, Networks, Drives and I/O

Reginald Snyder, TMEIC Corp. Americas

This discussion covers the workhorses of the distributed control system framed in an industrial control system architecture. Controller basics, communication network types and function, the role and functionality of drives and I/O are explained.

11:15 a.m.  
Sensors and Gauges (HSM)

Christopher Burnett, Thermo Fisher Scientific

Noon  
Lunch

1 p.m.  
Gauges (CM)

Gregory Gutmann, ISRA Surface Vision Inc.

This presentation provides a general overview of sensors in the cold rolling process area with a focus on surface inspection, including an overview of surface inspection in the hot strip mill and other process lines.

1:45 p.m.  
Gauges (Process Line)

Brian Smith, ANDRITZ Metals USA Inc.

2:30 p.m.  
Break

2:45 p.m.  
Drive Types

Marcelo Lara, TMEIC Corp. Americas

Evolution of the drives technology following the development of power electronic devices. Principles of operation of the different types of drives. Impacts to the power system in terms of harmonics, power factor and overall system efficiency.

4:15 p.m.  
Motors

Mark Sharamitaro, Morgan Engineering Systems Inc.

Overview of motor theory and operation.

5 p.m.  
Reception

## Wednesday, 15 September 2021

7 a.m.  
Breakfast

8 a.m.  
Typical Automation Topology (HSM)

Gary Gepitulan, TMEIC Corp. Americas

This session serves as an introduction to the fundamentals of computer networks — the review of the topologies as they apply to the hot strip mill. This presentation identifies the fundamental building blocks that form the network and reads the topology diagram, hardware, protocols, operating systems and security.

8:45 a.m.  
Typical Automation Topology (CM)

Thomas Richards, TMEIC Corp. Americas

This presentation will introduce the basics and focus on the control and data requirements.

9:30 a.m.  
Break

9:45 a.m.  
Typical Automation Topology (Process Line)

Luke Aaron, SMS group Inc.

10:30 a.m.  
Roundtable Discussion

Panelists: Marcelo Lara, TMEIC Corp. Americas; Reginald Snyder, TMEIC Corp. Americas; Christopher Burnett, Thermo Fisher Scientific; Alec Glenn, AM/NS Calvert LLC

11:15 a.m.  
Introduction to Plant Tour

Alec Glenn, AM/NS Calvert LLC

This presentation will cover what it means to be in electrical and automation, the future, and how important it is to be involved with cutting-edge technologies. It will include discussion of what AM/NS Calvert has done to advance our field.

11:30 a.m.  
Lunch

12:30 p.m.  
Depart for Plant Tour of AM/NS Calvert LLC 🌄

4 p.m.  
Return From Plant Tour and Adjourn