



Course Catalog Number: Tem-3
Course Track: Electrical Measurements
Course Topic: Current & Resistance
Course Career Level: Intermediate

Sunday, August 25 | 8:00 AM - 5:00 PM | 1-Day (8 Hours)

Course Title: AC Current and Resistance Measurements and Principles

Instructor: Mark Evans, Guildline Instruments Ltd.

Abstract: This course will cover AC current and resistance shunt measurements from 20 mA to 100 A; at frequency ranges from 20 Hz to 100 kHz. Topics to be covered relate to AC measurements, both sourcing and measuring including the use of AC current shunts, AC current transformers, calibrators and transconductance amplifiers. The focus will be on generating and measurement AC currents with frequencies from 20 Hz to 100 kHz. Design considerations for AC shunts and transconductance amplifiers will be discussed as well as connectors, cables, grounding, and complete measurement setups. Uncertainty contributions will be examined including power and temperature coefficients as well as AC noise, EMI and frequency effects.

In addition to the theory, hands-on measurements will be made to reinforce concepts and best practices. AC sources provided for the training will include a calibrator and a transconductance amplifier. AC measurements will be made with various AC shunts, with frequencies from 20 Hz to 100 kHz. The use of various connectors, adaptors and cables will be discussed and demonstrated. AC current measurements will be examined along with the effects of environment factors such as temperature, power, EMI and other noise sources, and frequency induced parasites. Best practices, including those related to safety, will be demonstrated. Example of Uncertainty budgets will be discussed and developed for the hands-on measurements.

Learning Objectives:

1. The participant will understand best practices for AC Resistance and Current design and measurements and the theory behind these practices. Hands-on measurements will be used to help reinforce these concepts.
 2. The participant will learn to quantify the caveats governing AC Resistance and Current measurements to derive a practical uncertainty budget which includes all aspects from traceability, environmental conditions, and operator error.
 3. The participant will learn measurement and safety considerations when using AC high current and how to address these in real-world applications.
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Instructor Curriculum Vitae (CV):

With 20 years of experience, Mark Evans is a Senior Designer and leads the development of many of Guildline's new and flagship products including those related to resistance measurements. He is highly recognized world-wide within the electrical Metrology community for his knowledge and skills. His responsibilities cover both software development and electrical design. Having authored and presented several papers and courses pertaining to best measurement practices in the field of electrical and temperature metrology, Mark is well established as a professional trainer and solution provider and integrator. He is often called upon to give training in primary and national laboratories around the world as well as presentations and workshops on many different aspects of metrology at international conferences and seminars.