Gage Calibration IMTS Education Event, Sept. 19-21, 2016

Seminar 114: Hands-On Gage Calibration

Enjoy three events in one trip to the Chicago area!

- **Visit IMTS in Chicago – the International Manufacturing Technology Show**
- **Tour Mitutoyo America's headquarters in Aurora**
- **Attend our popular Dimensional Metrology course.**

Avoid the cost and trouble of getting to IMTS by staying in select hotels in Aurora that provide free shuttles to the Metra trains going into Chicago. In addition, register and attend our special offering during IMTS week and receive free tickets to the show.

The Hands-On Gage Calibration course is a unique, active, educational experience designed specifically for those who plan and perform calibrations of dimensional measuring tools, gages, and instruments. This course is taught at the world-class, Mitutoyo America A2LA accredited calibration laboratory in Aurora, Illinois, by experienced instructors and dimensional metrology experts. The class size is intentionally small – a maximum of 6 students – to ensure personalized and customized instruction to meet the needs of individual students. The course combines modern calibration and quality management ideas with best practices and "how-to" calibration methods for common calibrations. The course is ideal for those operating in ISO/IEC 17025 accredited laboratories or in gage labs supporting manufacturing operations.

The course covers the most common dimensional calibrations but also allows for individual students to cover topics of interest. Upon enrollment, students will have the opportunity to complete a questionnaire to ensure the customized course meets their specific needs. The Hands-On Gage Calibration course will also address the essential elements, policies, and requirements of a modern gage calibration system. Woven into the hands-on experience, the course will cover calibration system standards, laboratory management, traceability, measurement uncertainty, temperature issues, and laboratory accreditation.

	Item to be Calibrated	**Calibration Method**
☒	Micrometers – outside	Comparison to gage blocks
☒	Calipers – vernier, dial, digital	Use of caliper checker or gage blocks
☒	Dial and test indicators	Indicator tester
☒	Digital indicators	Comparison to gage blocks
☒	Height gages	Comparison to gage blocks
☒	Length standards (e.g. micrometer standards and step gages)	Mechanical comparison
☒	Plug and pin gages	Laser scanning micrometer
☒	Radius/angle gages	Optical comparator
☐	Gage blocks	Mechanical comparison
☐	Ring, plug, and pin gages and spheres	1-D comparator or CMM
☐	Micrometer heads	1-D comparator
☐	Thread measuring wires	1-D comparator
☐	Thickness gages	1-D comparator
☐	Sine bars	1-D comparator
☐	Line scales	Vision CMM
☐	Squares	Comparison to master square or CMM

☐	Roundness of spheres, hemispheres, rings, and plugs	Form measuring instrument
☐	Straightness of straightedges	Form measuring instrument
☐	Cylindrical squares	Form measuring instrument
☐	Optical flats	Optical comparison to optical flat
☐	Surface finish specimens	Surface finish instrument
☐	Micrometers – inside, depth	Comparison to gage blocks
☐	Linear gages	Comparison to gage blocks
☐	Bore gages	Comparison to ring gages
☐	Precision levels, Protractor	Sine bar and gage blocks

☒: covered in depth with extensive hands-on experience ☐: depth of coverage depends on requests of students

Prerequisites: With the small size class, it is important that all students have the necessary background and training to ensure they receive the full benefit of the hands-on experience. Attendees should have general knowledge of calibration systems and experience operating various types of dimensional measuring instruments, equivalent to the Mitutoyo educational Seminar 116 – Dimensional Metrology: Measurement, Inspection and Calibration

Course Materials: The course materials include extensive photographs and descriptions of calibration methods, as well as complete calibration procedures, worksheets, and example certificates.

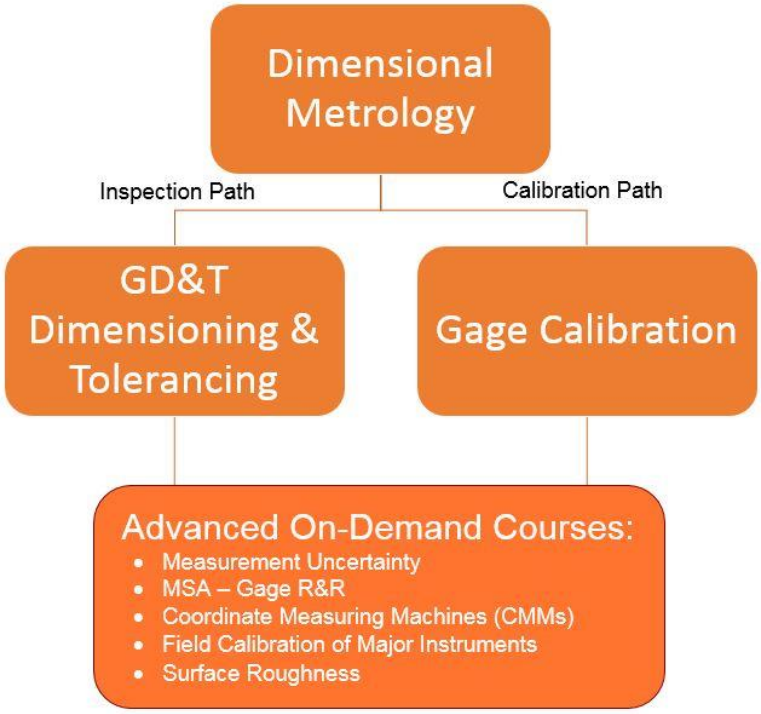
Registration: For questions or registration, please call the Education Department at 888-MITUTOYO (option 6) or direct at 630-723-3620. Office hours are 8:30 am to 5:00 pm Central Time. We can be reached via email at mim@mitutoyo.com. Purchase orders can be faxed to 630-978-6471.

Pricing:

Course	No. of Days	Advanced Price	Standard Price
Seminar 114: Hands-On Gage Calibration	3	$ 1861	$ 2044

- Advanced pricing applies when registration is completed more than 2 weeks prior to the class starting.
- A discount of 10% is available when registering more than two students for the same course.
- For cancellation information, please visit our website at www.mitutoyo.com/education.

Comprehensive Curriculum: The Mitutoyo Institute of Metrology offers a number of courses to meet the educational needs of manufacturing, quality, and measurement professionals. Our course are scheduled regularly throughout the year. The advanced courses are scheduled less frequently and are available on customer request in certain locations.



Mitutoyo Institute of Metrology

Mitutoyo and the Mitutoyo Institute of Metrology is a worldwide organization. We are proud to state that more than 200,000 engineers, technicians and managers have attended our measurement seminars over the years. If you wish to register or if you have additional questions, please contact us at 630-723-3620, 888-MITUTOYO, or email mim@mitutoyo.com. Please visit our website for cancellation information at www.mitutoyo.com/education.