



INTRODUCTION

The enhanced understanding of measuring jobs and influencing parameters enables measuring technicians to reduce measuring uncertainties and thus to make measurement results more reliable and easier to compare. The minimization of costs and waste is supported.

The seminar lays and consolidates basic knowledge of production metrology for beginners and advanced metrologists. The didactic approach used in the seminar is based on the latest findings. The seminar covers the latest knowledge regarding dimensional tolerancing, programming basics, measurement process planning, and the machine and sensor technology used.

Keeping this in view, Indian Machine Tool Manufacturers' Association is organizing a 4-day training on **"AUKOM Certified Metrologists LEVEL 1"** in association with Carl Zeiss (a certified partner of AUKOM)

FOCUS AREAS

- Units
 - SI Units, incl. Definition and History, Base Quantities, Derived Quantities, Prefixes of Units, Angles, Conversion Degrees <-> Radian, Conventional Measuring and Test Equipment
- Coordinate Systems
 - (Mathematical) Drawing Plane, Origin, Cartesian Coordinates, Right-Hand Rule, Translation and Rotation, Polar Coordinates, Cylindrical and Spherical Coordinate System
- Coordinate Measuring Machines
 - History of Coordinate measuring machines, Cantilever/Bridge/Column/Gantry Types, Differences in the Types, Axis Guide, Measuring Computer and Software, Work Holding Fixture, Accuracy of Coordinate Measuring Machines, CAA Correction, Form Measuring Machines
- Sensors
 - Sensor selection, Stylus System, Stylus, optical sensors, Image Processing, Laser Triangulation
- Basic definitions
 - Drawing Entries (Dimensions, Tolerance Symbols), Standard Reference, Differences Nominal Element - Real Element - Extracted Element - Associated Element, Free Form surfaces
- Dimensional Tolerance
 - Dimensional Tolerances, Taylor's Principle, Standards, Symbols and Drawing Entries, Length Dimensions, Angular Dimensions, Limiting Dimensions and Fits, ISO Fitting/Mating System, Common Tolerances
- Geometric elements
 - Standard form elements: Plane/ Cylinder/ Cone/ Sphere/ Line/ Circle/ Point/ Ellipse, Vector, Normal Vector, Minimum Number of Points, Projection
- Geometric constructions
 - Calculation of characteristics out of two geometrical features (distance, angle), Calculation of features out of two geometrical features (Intersection, Symmetry), Calculation of new features out of some geometrical features (Construction)
- Preparing a Measurement on the Coordinate Measuring Machine
 - Standardized Temperature, Part Cleaning, Temperature Control, Fixturing, (Avoiding Distortion), Fixturing Systems, CMM and Software Startup
- Stylus Selection and Qualification
 - Stylus System Selection, Stylus Qualification, Reference Sphere, Reference Stylus, Stylus Sphere Radius Correction, Stylus Tip Bending Correction, Mechanical Filter Effect of the Stylus, Errors of Incorrect Qualification,
- Measuring using Coordinate Measuring Machines
 - Determining part Coordinate System, Difference to Control Coordinate System, Manual and automatic Alignment, Probing, References, Consequences of Collisions, Number of Probing Points and their Distribution, Influences on measuring result
- Evaluation of Measurement and Statistics
 - Importance of Statistical Parameters, Outliers, Scattering, Histogram Representation, Compensation Methods, Influences on measuring result
- Inspection planning
 - Completely defined characteristic, Purpose of the Measurement, Production of workpiece, Function of workpiece, Feature description, Manufacturing Methods and Accuracies, Shape Deviations, Uncertainty Effects, Awareness of Measuring Uncertainty, Inspection planning, Identifying measuring features
- Documentation and Quality Management
 - Measurement Reports, Quality Control Charts, Cooperation between Design - Production - Testing, Reproducible and Clear Measurement Documentation, Measuring Strategy documentation

KEY TAKE AWAYS

After undergoing the programme, the participants will be able to -

- Develop awareness, knowledge and skills necessary for the reliable measurement application / assessment of measurement quality
- Evaluate correct measuring methods / comparative measurements
- Get Hands-on practice in handling various measuring instruments
- Have overview of advanced measuring systems including CMM

PARTICIPATION FEE

Rs. 55000/-

+18% GST

**IMTMA Members/ Micro Companies/ Individuals/
Educational Institutions / Students/ IMTMA Non
Members/ Others**

USD 2200/-

Overseas Participants

Group Concession : 10% for 3 to 5 and 20% for 6 and more delegates being nominated from the same company

PARTICIPANT PROFILE

Practicing engineers, new recruits in the industry, quality professionals

FACULTY

This Program will be conducted by **Mr. Sivakumar Asokan,**

Mr. Sivakumar Asokan, is an accomplished industry expert with two decades of experience in the field of Metrology, specializing in precision measurement and quality control. As a certified AUKOM Level 1, 2, 3 and GD&T Trainer, possess deep expertise in interpreting and applying GD&T standards to enhance measurement process and efficiency. Conducting in-depth training sessions for professionals to improve their GD&T skills in the field of metrology. Trained over 400 professionals in various AUKOM levels. Passionate about solving complex measurement challenges and contributing to the success of clients and the broader industry.

For Registration Contact

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REGISTRATION : Prior registration for participation is necessary. Number of participants is limited and will be accepted on 'First Come First Serve' basis. A Certificate of participation will be issued to participants.

Important Information : Participation fee includes, course material, working lunch and tea / coffee. Interested companies are requested to register online by clicking on 'REGISTER' button and by filling up the nomination authority and participant's details in specified form.