

**Last date for registration 02 September 2024**

## 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 furthers basic knowledge of production metrology for advanced measuring technicians. The didactic approach used in the seminar is based on the latest findings.

Keeping this in view, Indian Machine Tool Manufacturers' Association is organizing a 5-day training on "**AUKOM Certified Metrologists LEVEL 2**" in association with **Carl Zeiss (a certified partner of AUKOM)**.

**Note: -**

- **Seat is limited to 12 participants**
- **AUKOM L1 certification is mandatory to attend AUKOM L2 certification**

## FOCUS AREAS

- Overview of the Entire Measuring Process
  - Short repetition of the contents of level 1
- Geometric Overview
  - Standard Geometric Elements, Surface and Space Points, Punched Hole/Slot, Tetragonal/Hexagonal Hole, Symmetry, Perpendicular, Parallelism, Angle in Space, Coordinate System Transformations
- Form, Orientation and Location Tolerances
  - Introduction to GD&T (ISO and ASME), Symbols and Drawing Entries, Form Tolerances, Orientation, Location and Runout Tolerances, Principle of independency and envelope requirement, ASME rule #1
- Measuring Strategy
  - Define Clamping Setups and References (Practical Instructions), Order of Reference and Origin Selection, Iterative Alignment, Alignment According to the 3-2-1 and Best-Fit Methods (3-D Fit), Measuring Element and Auxiliary Elements, Machine Grid Measurements, Contour Measurements, Measurement with Cylinder Surfaces, etc.
- Probing Strategy - Tactile Sensors
  - Number and Distribution of Probing Points, Probing Force and Speed, incl. Material Properties, Stylus Diameter, Special Styli, Scanning
- Probing Strategy - Image Processing
  - Single-shot measurement, Multi-shot measurement, Edge finder, contour image processing, local threshold and gradient method, illumination, filter, scanning, auto focus
- Probing Strategy - Distance Sensors
  - Laser triangulation sensors, Foucault sensor, White light sensor, Light section sensor, autofocus, Photogrammetry, Fringe protection, Influence on the measuring results
- Computer Tomography
  - Physical principle, tomography on the image, initial samplings, deviations to the nominal geometry, measurement of sections, checking the material structure
- CNC Programming
  - Types of CNC programming, principles of structured programming, user interfaces, parametric programming, program design - optimizing for cycle time and accuracy, feature-based measurement, offline collision simulation
- Measurement of Free Form Surfaces
  - Element types in Free Form Surface Metrology, basics, procedures in free form surface metrology, referencing and probing strategies
- Evaluation
  - Evaluation Criteria: Function-oriented and Manufacturing-oriented Evaluation Methods, Differences in the Association Methods, Constructions, Digital filtering, Measurement Logs
- Effects on the Measurement Result
  - Effects on the Measurement Result, Reduction of Measurement Uncertainty, Detection and Reduction of Systematic and Random Effects, Temperature Compensation
- Documentation
  - Principles of Documented and Reproducible Documentation, Graphic Evaluation, Form Plots, Measurement Reports and their improvement, documentation of fixturing, sensors, qualification, clamping and measurement strategy
- Good Measurement Practice
  - Metrology adds value, Good Measurement Practice, Necessity of Cooperation

## KEY TAKE AWAYS

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

- Obtain thorough knowledge and skills necessary for the reliable measurement application / assessment of measurement quality
- Measure GD&T Parameters
- Usage of different probes and probing methods
- Use different alignments, clamping & fixturing in CMM measurements
- Prepare measurement reports and documents
- **AUKOM certification**

## PARTICIPATION FEE

**Rs. 65000/-**

+18% GST

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

**USD 2600/-**

**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 who have completed level 1

## 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.