

## INTRODUCTION

In the modern manufacturing environment, process control and quality assurance depend increasingly on the performance of Co-ordinate measuring machines. Today CMMs have replaced traditional methods of inspection with gages and fixtures thus reducing the time and manpower required in quality control operations. However, thorough understanding of concepts, measuring uncertainty, GD&T, right probing method are very crucial for getting reliable results from any CMM.

Rapid growth of CMM population all over India has subsequently generated enormous demand of Trained / Skilled engineers for successful & meaningful handling inspection challenges. This can be achieved only if the CMM engineer possesses basic engineering knowledge, Inspection skills and has a logical and analytical approach to fulfill the task.

This course will cover in detail about all the aspects a practicing CMM engineer requires to know for effective use of CMM for reliable measurement results. Hands-on training in CMM with live measurement exercises of industry components will be given more emphasis.

## FOCUS AREAS

- Introduction to CMM and Proper use of CMM
  - Types of CMMs – Cantilever, Bridge, Gantry & Portable CMMs.
  - Types of Probes, Probe Heads & Styli. Advantages & Limitations
  - Interpretation of Measuring Uncertainty; International Standards & Norms
  - Environmental conditions, specifications, their Importance and effect on measurements.
  - Calibration of a CMM, Frequency & Methods.
- GD&T-Geometric Dimensioning & Tolerancing
  - Specifying and Interpreting GD&T parameters in Engineering Drawing
  - Meaning of RFS, MMC and LMC conditions
  - Measurement of Form, Orientation, Location and Profile tolerances in CMM
  - Exercises and Sample drawings for arriving at right inspection procedure
- Using CMM for Dimensional checking and validation
  - Importance & Dynamics of Probing system; Selection of right probing system
  - Mounting probe head and fixing styli
  - Configuring probes (Styli), Calibration with Master Sphere
  - Basic Geometric Elements & their Classification.
  - Lines & Vectors (I, J, K), Directional Cosines their definitions and application in programming.
  - Understanding adequacy of number of points, effect on element computation & result output.
  - Methods of component alignment & Logical Approach
  - Hands-on practice / Group exercises in measuring Industry parts.
- Advanced options in using CMM
  - Programming movements & precautions
  - Understanding Limitations of computing Form errors. (Flatness, Circularity, Cylindricity etc.)
- Do's & Don'ts while using CMMs
- Hands – on practice and Group exercises on CMM.

## KEY TAKE AWAYS

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

- Learn operation of CNC CMM for dimensional measurements through hands-on training
- Perform Part alignment and Probe calibration in CMM
- Understand the various GD&T parameters and interpret them as given in Drawing
- Inspect GD&T parameters in CMM and to generate part inspection reports
- Learn best measuring practices as well as Do’s and Don’ts while using CMMs

## PARTICIPATION FEE

**Rs. 10000/-**  
+18% GST

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

**USD 400/-**  
**Overseas Participants**

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

## PARTICIPANT PROFILE

This course will benefit Managers, Engineers & Supervisory personnel responsible for obtaining the best output from Co-ordinate Measuring Machines. Practicing engineers in quality and production functions from Machine Tool, Automobile, Tool room, General engineering and other capital goods manufacturing industries will immensely benefit from the contents. It will be specifically useful for Existing CMM engineers who may have faced significant problems in day to day applications And also for New CMM engineers who may have lot of doubts / grey areas on CMM applications and right ways of using CMM.

Pre-requisite: Participants should have basic knowledge of Engineering drawing and Geometric Dimensioning and Tolerance (GD & T).

## FACULTY

This course will be conducted by Industry experts from **IMTMA Technology Centre, Bangalore.**

The course will be practical oriented and highly interactive where participants can clear their doubts with regard to correct measurement procedure for specific components from their industry.

### For Registration Contact

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